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KOÇ UNIVERSITY - İŞBANK
CENTER FOR INFECTIOUS DISEASES

SEMINAR ON PET-RELATED AND EMERGING ZOONOTIC INFECTIONS

DATE: 23 & 24 OCTOBER 2025

Occupational Infections of Zoonotic Origin among Healthcare Workers

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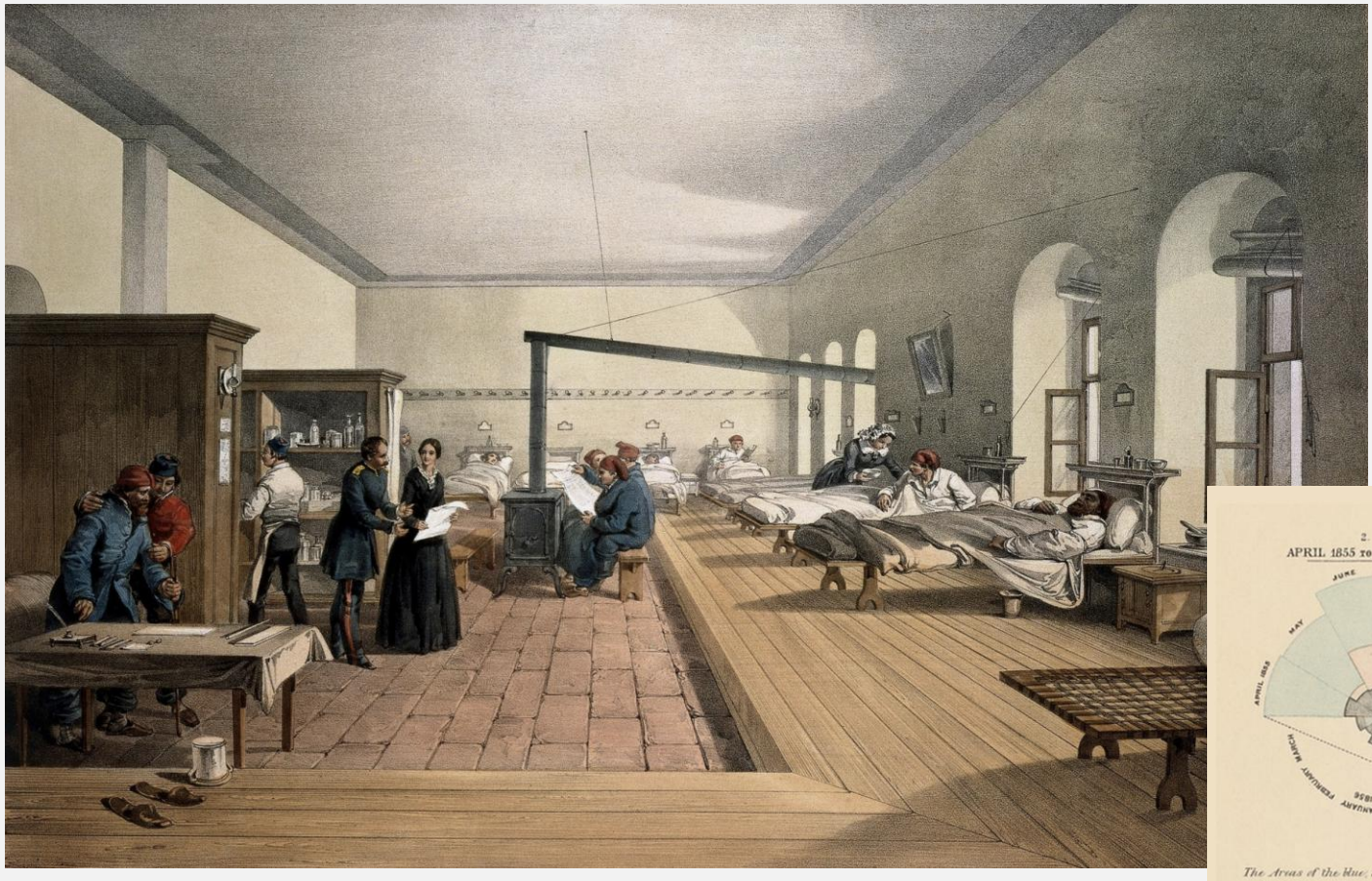
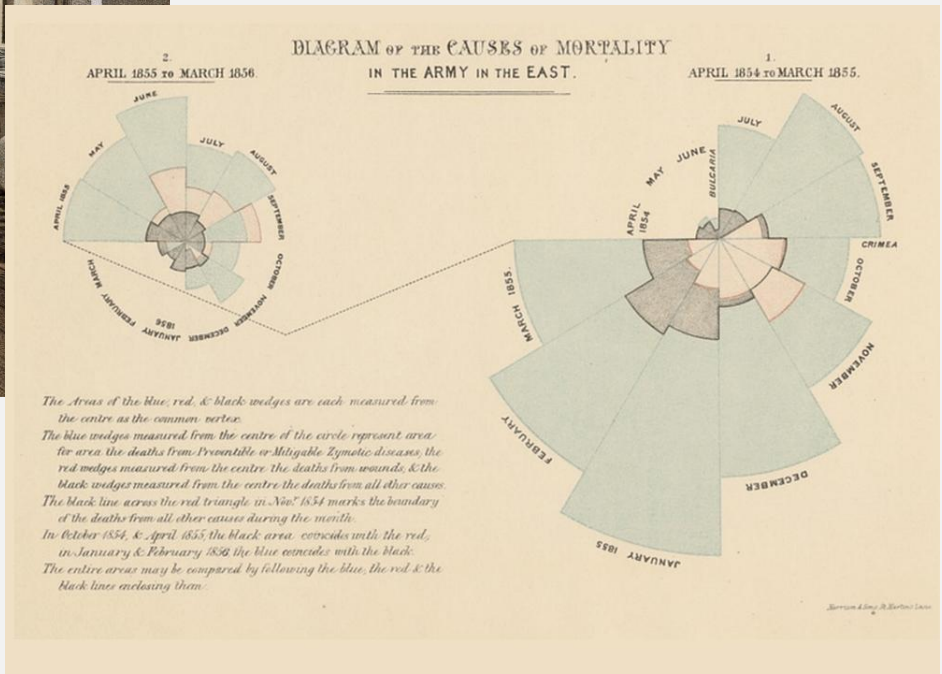
Content

Bacterial Zoonoses
Brucellosis
Q Fever (Coxiella burnetii)
Tularemia (Rabbit fever)
Salmonella infections (can be transmitted from animals or contaminated food/water)

Viral Zoonoses
Rabies
Emerging Viral Infections (Ebola, Marburg, CCHF or Nipah viruses)
Avian Influenza (Bird Flu)
Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

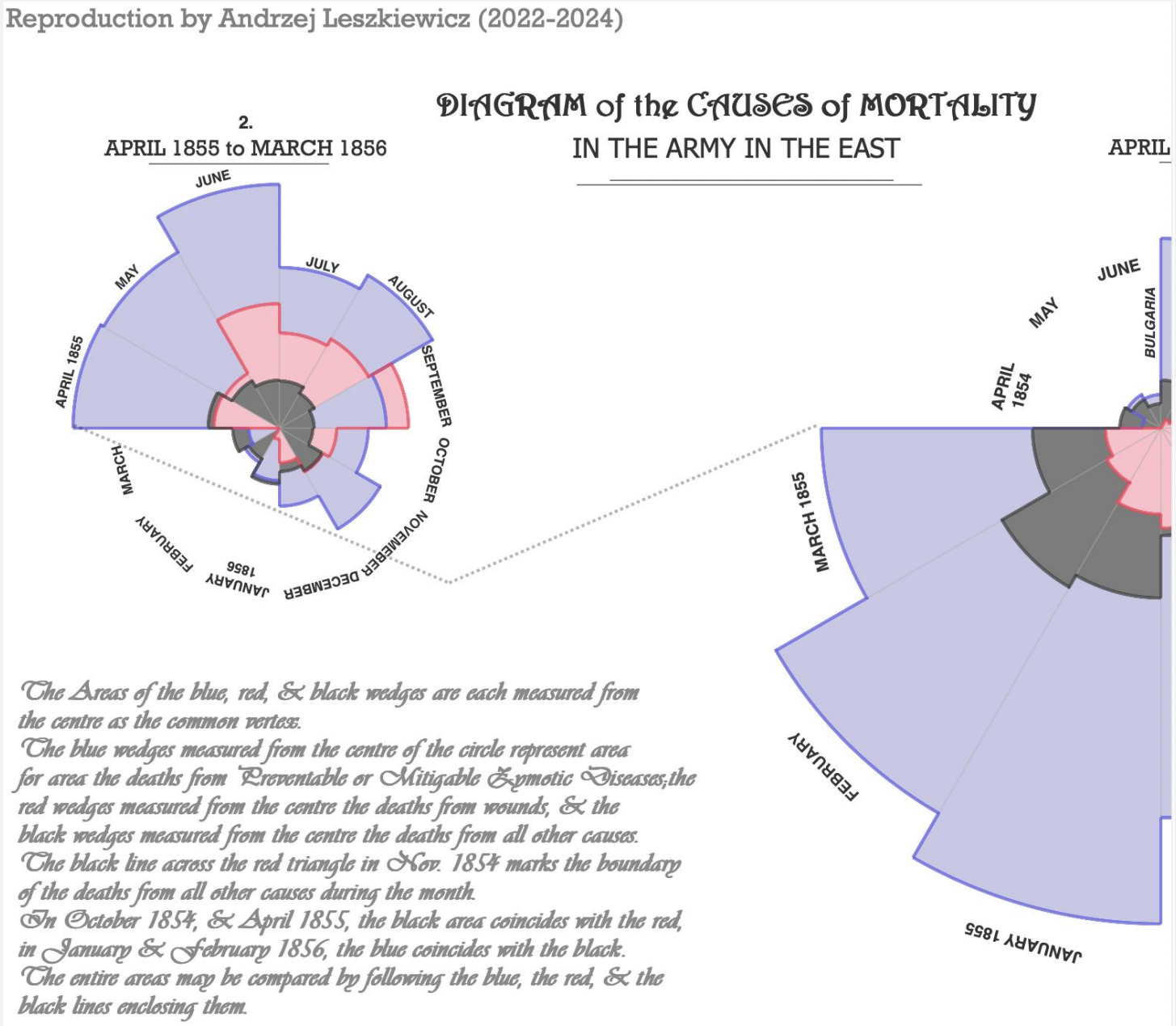
Parasitic Zoonoses
Cryptosporidiosis
Toxoplasmosis
Giardiasis





Florence Nightingale Rose Diagrams

Reproduction by Andrzej Leszkiewicz (2022-2024)



Transmission Routes in Healthcare Settings

Contact Transmission: Direct or indirect contact with a patient's body fluids, contaminated surfaces, or medical equipment.

Droplet/Airborne Transmission: Exposure to respiratory secretions or aerosols from an infected patient (e.g., in cases of zoonotic influenza or specific hemorrhagic fevers).

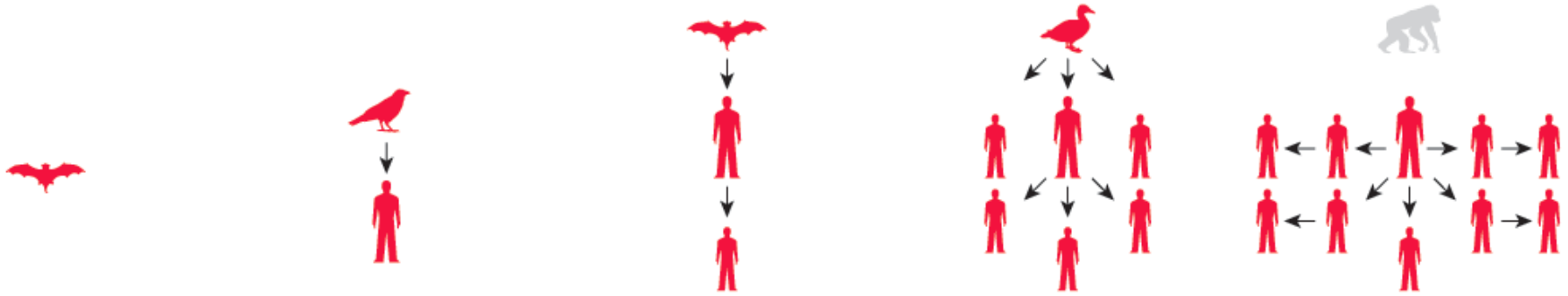
Sharps Injuries: Accidental inoculation with contaminated blood or body fluids.

Zoonotic origined occupational infections among healthcare workers

Pathogen / Disease	Transmission Route	High-Risk Exposure / Occupation	Clinical Impact	Region / Prevalence
Mycobacterium bovis (zoonotic TB)	Airborne (aerosols from infected tissues, lab exposure)	Laboratory	Pulmonary or extrapulmonary TB	Sporadic in Europe, Africa, South America
Brucella spp.	Direct contact, inhalation of aerosols	Laboratory	Undulant fever, osteoarticular and hepatic involvement	Endemic in Mediterranean, Middle East, Latin America
Coxiella burnetii (Q fever)	Aerosol inhalation from animal products	Laboratory, obstetric HCWs	Fever, pneumonia, hepatitis; chronic endocarditis	Global; occupational clusters in Europe, Australia
Francisella tularensis (tularemia)	Aerosol, skin inoculation	Laboratory	Ulceroglandular or pneumonic tularemia	North America, Europe, parts of Asia
Leptospira spp. (leptospirosis)	Contact with urine, blood, or water	Laboratory	Febrile illness, Weil's disease	Tropical regions; outbreaks post-flooding
Rabies virus	Bite, scratch, saliva exposure	Veterinarians, lab, emergency staff	Fatal encephalitis	Asia, Africa, Latin America
Orf virus (Parapoxvirus)	Direct contact with lesions or fomites	Dermatology, veterinary, laboratory	Local pustular lesions on hands	Global; frequent in sheep/goat handlers
Monkeypox (Mpox, Orthopoxvirus)	Contact, droplets, fomites	Infectious disease, dermatology, lab	Febrile rash, lymphadenopathy	Central Africa; 2022 global outbreak
Hantaviruses	Inhalation of rodent excreta	Laboratory, field epidemiology	HFRS or HPS	Europe, Asia, Americas
Ebola and Marburg viruses (Filoviridae)	Blood and body fluids	Infectious disease and ICU HCWs	Severe hemorrhagic fever, high mortality	Africa; healthcare outbreaks
Crimean-Congo hemorrhagic fever (CCHF)	Blood contact, needlestick, aerosols	ICU, infectious disease, laboratory	Severe hemorrhagic fever, high mortality	Endemic in Türkiye, Balkans, Africa
Lassa virus	Aerosols, blood, secretions	West Africa healthcare settings	Hemorrhagic fever, multi-organ failure	West Africa
SARS-CoV, MERS-CoV, SARS-CoV-2	Droplet, aerosol	HCWs during outbreaks	Pneumonia, ARDS	Global
Influenza A (avian, swine origin)	Droplet, contact with secretions	HCWs during zoonotic influenza care	Respiratory infection	Sporadic zoonotic cases worldwide
Bartonella henselae (cat scratch disease)	Scratch, bite, contact with infected animals	Veterinary, emergency, lab staff	Regional lymphadenitis, fever	Global

EMERGING THREATS

The size and severity of disease outbreaks depends on where the causal agent sits in an evolutionary spectrum, ranging from animal viruses that have yet to leap to humans, to pathogens that have evolved to spread easily between humans.



1. Animals only
Potential threats, including pathogens from families that have caused human disease in the past.

Examples:
poxviruses, paramyxoviruses.

2. Limited spread
Pathogens that pass from animals to humans but do not spread further.

Examples:
H5N1 flu, Nipah, rabies.

3. Small outbreaks
Pathogens that spill over and then spread between just a few people.

Examples:
MERS, Marburg.

4. Large outbreaks and epidemics
Pathogens that spill over into large numbers of people, or spread between many people.

Examples:
Chagas disease, cholera, Ebola.

5. Human only
Animal pathogens that have evolved to become human viruses.

Examples:
HIV/AIDS, measles, tuberculosis.

ADAPTED FROM N. D. WOLFE *ET AL. NATURE* **447**, 279–283 (2007)

24 | NATURE | VOL 524 | 6 AUGUST 2015

Laboratory acquired brucellosis

TABLE 3 Demographics of laboratory workers exposed to *Brucella* spp. and laboratory-acquired brucellosis (LAB) cases

Occupation or facility	No. exposed (n = 167)	No. with LAB (n = 71)
Occupation		
Microbiologist	158	62
Researcher	3	3
Clinician	3	3
Administrator	2	2
Unknown	1	1
Facility		
Clinical	142	46
Reference	2	2
Research	15	15
Vaccine production	2	2
Unknown	6	6

TABLE 2 Summary reports describing laboratory exposures to *Brucella* spp. and laboratory-acquired brucellosis

Author(s) (reference)	Yr	Country	Data source	No. of cases/ denominator[a]	No. with risk level		
					High	Low	Unknown
Grist and Emslie (72)	1985	United Kingdom	Survey	1/5,330*	1	0	0
Miller et al. (63)	1987	U.S.	Facility review	18/128†			18
Olle-Goig and Canela-Soler (56)[b]	1987	Spain	Incident report	28/164‡	21	7	0
Staszkiewicz et al. (73)	1991	U.S.	Incident report	8/26‡	5	3	0
Ergonul et al. (74)	2004	Turkey	Facility review	12/55§			12
Hasanjani Roushan et al. (75)	2004	Iran	Facility review	38/469¶			38
Reid (76)	2005	Ireland	Facility review	6/158§			6
Bouza et al. (62)	2005	Spain	Survey	75/628*			75
Al Dahouk et al. (77)	2005	Germany	Facility review	1/31¶			1

Traxler RM, et al. JCM 2013

Laboratory acquired brucellosis in Turkey

Table II
Multivariate analysis for the predictors of laboratory-acquired brucellosis cases

	Odds ratio	95% Confidence interval	*P* value
Use of biosafety cabinet level II	0.13	0.03–0.60	0.009
Duration of professional life	0.86	0.80–0.92	<0.001
Being a physician	1.07	0.49–2.33	0.845
Being a staff	3.21	0.85–12.11	0.085
Full adherence to glove use	0.27	0.11–0.65	0.004
Male gender	2.14	1.02–4.45	0.042
Performing bacterial isolation	5.12	2.28–11.52	<0.001

The survey response rate was 100%.

Of the 667 laboratory workers, 38 (5.8%) had a history of Laboratory acquired Brucella infection.

Sayin-Kutlu S, Kutlu M, Ergonul O, Akalin S, Guven T, Demiroglu YZ, Acicbe O, Akova M. Laboratory-acquired brucellosis in Turkey. J Hosp Infect. 2012

Risk factors for occupational brucellosis among veterinary personnel in Turkey

- Of 712 active veterinary personnel, 84 (11.8%) had occupational brucellosis.
- The median number of years since graduation was 7 (interquartile ranges [IQR], 4–11) years in the occupational brucellosis group, whereas this number was 9 (IQR, 4–16) years in the non-brucellosis group ($p < 0.001$).

Multivariable analysis for the risk factors of occupational brucellosis among veterinary personnel.

	Odds ratio	95% Confidence interval	*p*
Male gender	4.5	1.05–18.84	0.041
Private practice versus public institutions and universities	2.8	1.55–5.28	0.001
Injury during vaccine administration	5.4	3.16–9.3	<0.001
Number of the deliveries	1.01	1.002–1.02	0.014

Kutlu M, Ergonul O, Sayin-Kutlu S, Guven T, Ustun C, Alp-Cavus S, Ozturk SB, Acicbe O, Akalin S, Tekin R, Tekin-Koruk S, Demiroglu YZ, Keskiner R, Gönen I, Sapmaz-Karabag S, Bosnak V, Kazak E. Risk factors for occupational brucellosis among veterinary personnel in Turkey. Prev Vet Med. 2014

Occupational Q Fever among Healthcare Workers

Multiple Q fever outbreaks have been reported among workers in slaughterhouses, farms, animal research facilities, military units, and, rarely, hospitals and diagnostic laboratories.

Educational efforts should describe groups vulnerable to development of chronic Q fever, such as workers who have preexisting valvulopathy, a prosthetic heart valve, a vascular prosthesis, an aneurysm, are pregnant or might become pregnant, or are immunosuppressed, because these employees have a higher risk for a severe outcome or death if infected.

Although protection for at-risk workers can be provided by Q fever vaccination, a licensed vaccine for humans is only commercially available in Australia. Therefore, most workers in high-risk occupations in the United States are not vaccinated.

Transmission of *C. burnetii* to health-care personnel has been rarely reported. One obstetrician was infected through contact with the birth fluids of an infected parturient woman. Hospital personnel have become infected after autopsies of patients with Q fever, although the infection control precautions used, if any, are unknown.

Anderson A, et al. Diagnosis and Management of Q Fever: United States, 2013: Recommendations from CDC and the Q Fever Working Group. MMWR 2013.

Companion animal veterinary personnel have occupational risk for tularemia and One Health role for tularemia prevention in Kansas

A survey by 109 veterinarians and 19 technicians.

42% (47 of 109) of veterinarians reported diagnosing tularemia in cats and 13% (14 of 109) in dogs.

7% (8 of 109) of veterinarians reported having had tularemia.

When performing procedures with a high risk of exposure, such as lancing abscesses in tularemia suspects, glove use was 100% but additional personal protective equipment was inconsistent, including eye protection 70% (81 of 116) and surgical face mask 59% (69 of 116).

Antibody titer and PCR were common diagnostics, but 42% (26 of 62) of veterinarians reported never submitting a confirmatory test, with owner finances being the primary hurdle.

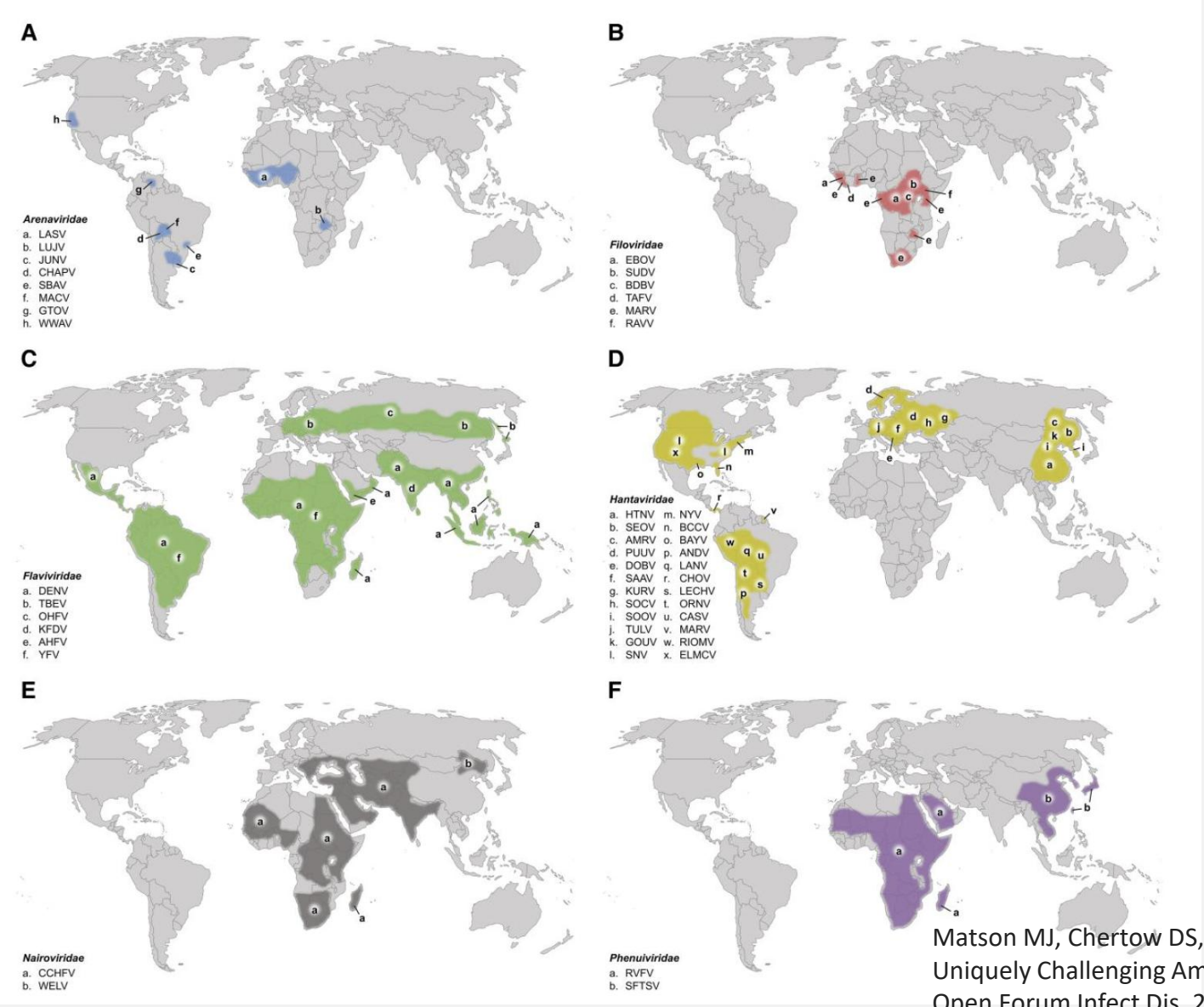
Veterinarians and technicians have inconsistent knowledge about reporting regulations, but 91% (58 of 64) discuss tularemia's public health risk with pet owners.

KuKanich KS, Mulcahy ER, Petro EM. J Am Vet Med Assoc. 2025

Mpox among Healthcare Workers

Country	HCW cases documented	Occupationally acquired cases
United States	A physician in California acquired mpox via non-needle stick occupational exposure.	1 confirmed occupational case
South Korea	One HCW infected via needlestick injury in healthcare setting.	1 confirmed occupational case
Multiple countries	WHO data: among 83,497 confirmed mpox cases by December 2022, **1,176** were HCWs (≈1.4%), but **most were not confirmed as occupational transmission**.	Only a small number confirmed occupational

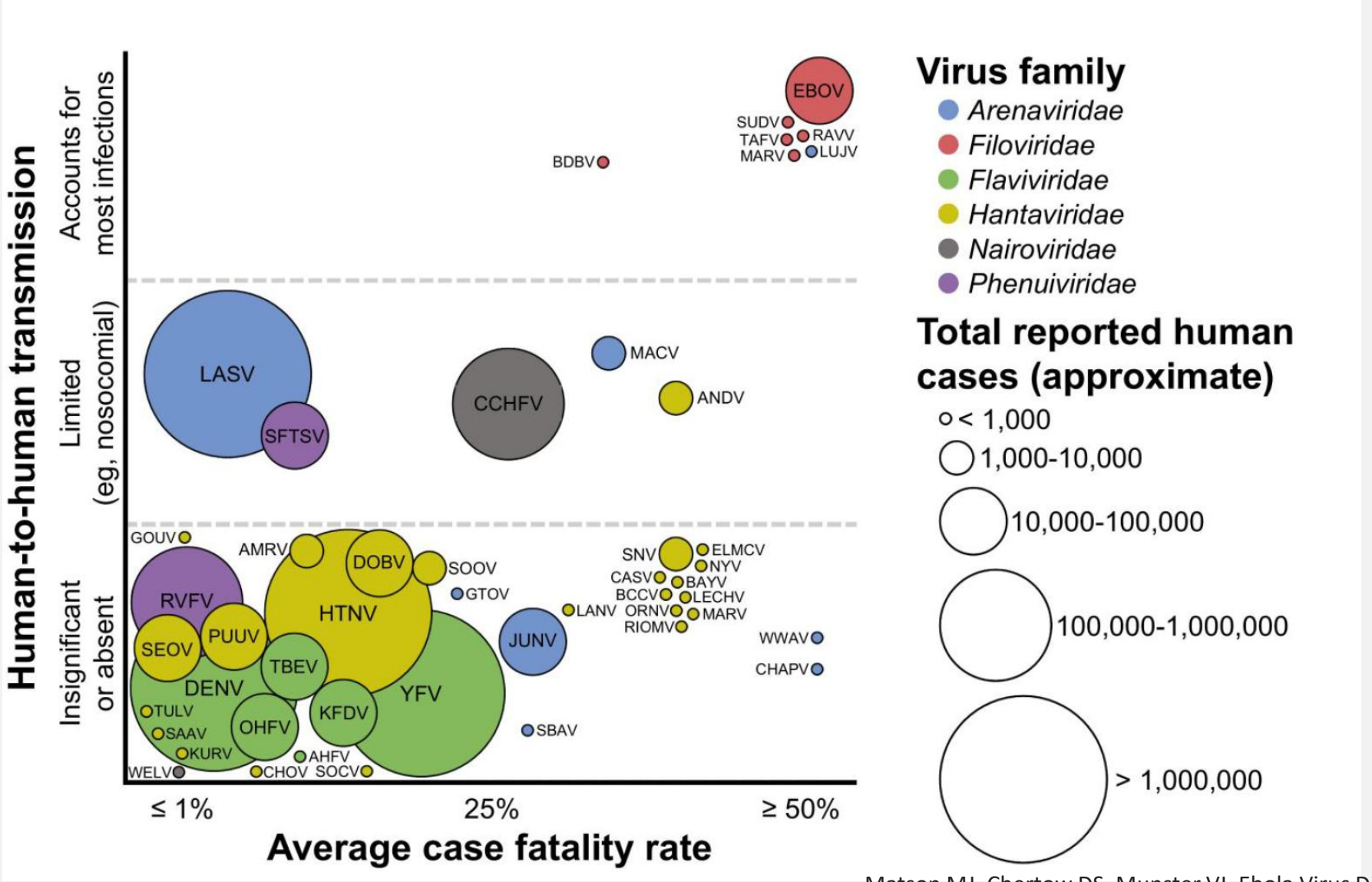
Viral Hemorrhagic Fevers



Matson MJ, Chertow DS, Munster VJ. Ebola Virus Disease: Uniquely Challenging Among the Viral Hemorrhagic Fevers. Open Forum Infect Dis. 2025

VHF	Human to human transmission
Ebola	High
Marburg	High
CCHF	High
Lassa	Moderate
Orthohantavirus	Low
Rift Valley Fever	No
Yellow fever	No
Dengue	No

Average case fatality rates, approximate cumulative known cases, and degree of direct human-to-human transmission for the hemorrhagic fever viruses by family



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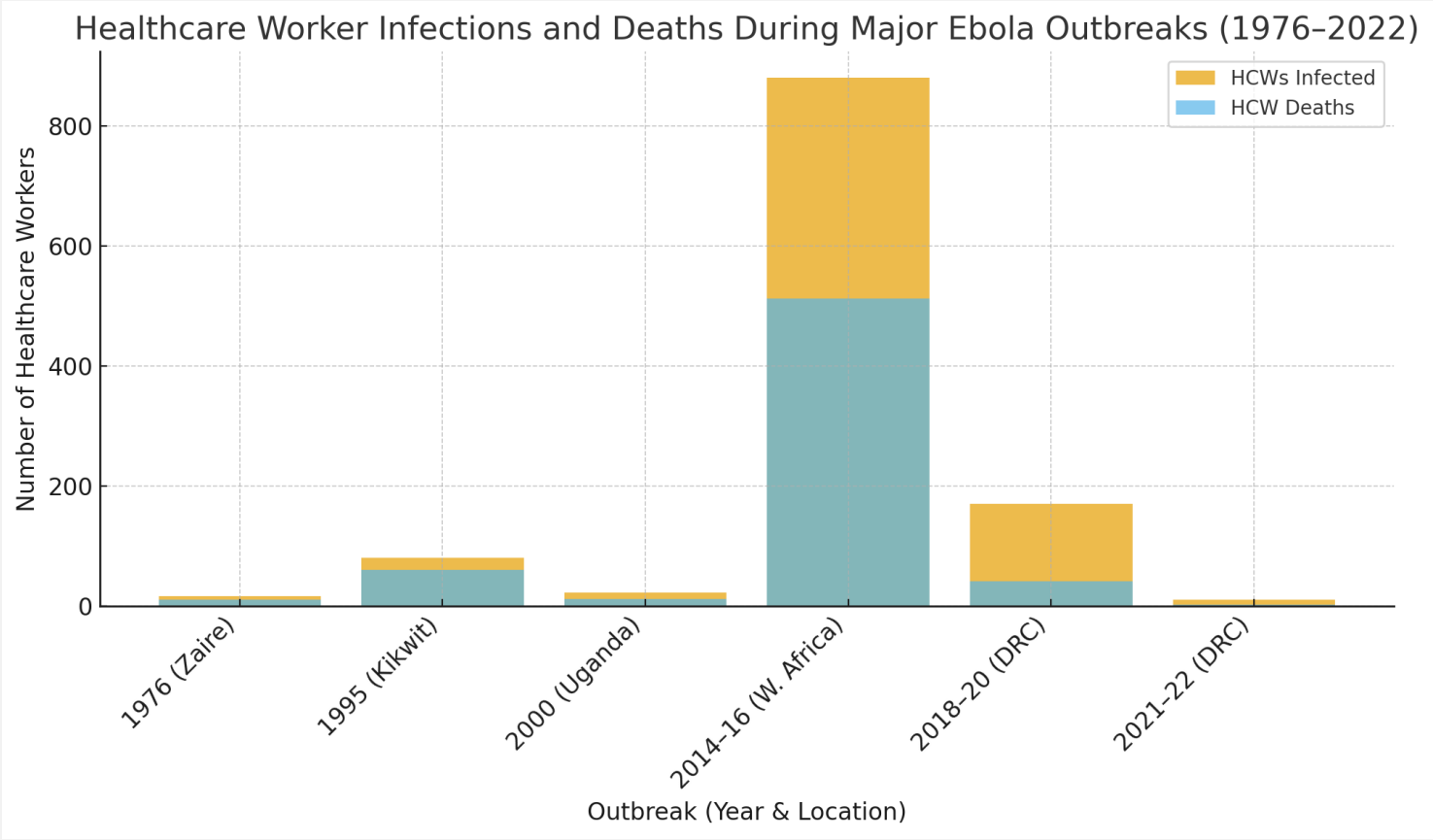


Period	Infected HCWs	HCW deaths	Key region(s)
1976–2013	~100–150	~80	Sudan, DRC, Uganda
2014–2016	~881	~513	West Africa
2018–2024	~200	~45	DRC
Total (approx.)	**~1,200+**	**~640+ (>50%)**	—

Outbreak of hantavirus disease caused by Puumala virus, Croatia, 2021

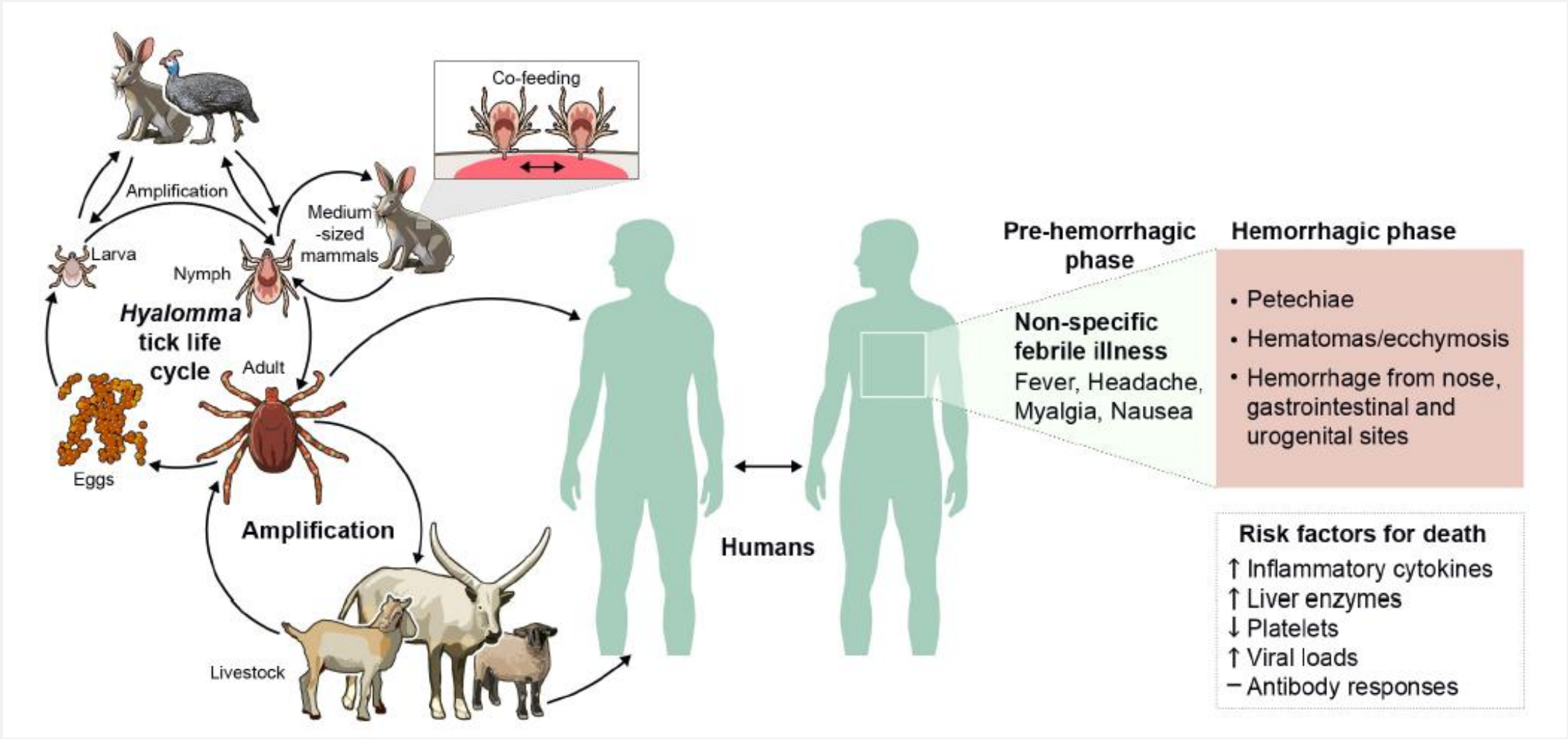
Table 1

Description of patients treated for hantavirus disease in the Clinical Hospital Center Rijeka, by age and mode of exposure, Croatia, 2021 (n = 254)[a]

Characteristics	Males n=177		Females n=77		All		OR	95% CI	p value
	n	%	n	%	n	%			
Age (years)									
<45	92	52.0	17	22.1	109	42.9	3.82	2.07–7.06	<0.001
45–64	68	38.4	43	55.8	111	43.7	0.49	0.29–0.85	0.005
≥65	17	9.6	17	22.1	34	13.4	0.38	0.18–0.78	0.004
Age (years) of patients with comorbidities (n = 93)									
<45	18	31.6	6	16.7	24	25.8	2.31	0.82–6.53	0.057
45–64	27	47.4	16	44.4	43	46.2	1.13	0.49–2.60	0.391
≥65	12	21.1	14	38.9	26	28.0	0.42	0.17–1.06	0.033
Reported mode of exposure									
Workplace exposure only	18	10.2	1	1.3	19	7.5	8.60	1.13–65.65	0.019
Workplace exposure and residence	66	37.3	8	10.4	74	29.1	5.13	2.32–11.33	< 0.001
Residence only	79	44.6	59	76.6	138	54.3	0.25	0.13–0.45	< 0.001
Leisure activity	10	5.6	5	6.5	15	5.9	0.86	0.29–2.61	0.397
Unknown	4	2.3	4	5.2	8	3.2	0.42	0.10–1.73	0.116

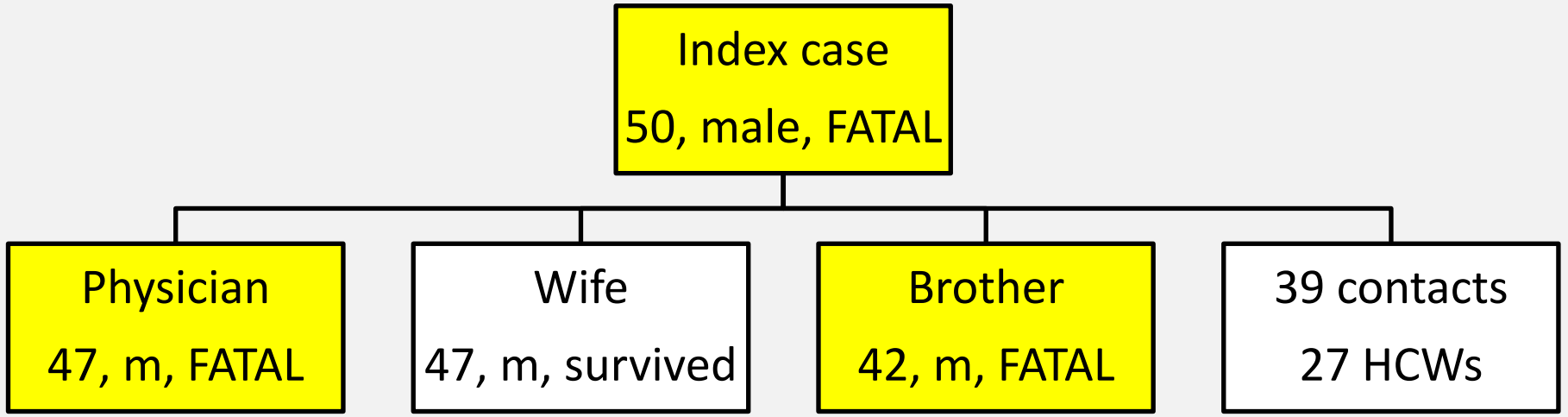
Exposure to rodent habitats has been associated with hantavirus infections, such as occupation (agricultural or forestry workers, military personnel and zoologists) and other activities in endemic areas (cleaning of cottages, lying or sitting on the ground in forests, drinking water from forest springs, eating unwashed raw fruits harvested in the forest or hunting)

Rončević Filipović M, et al. Euro Surveill. 2025



Feldman, 2018

Nosocomial Infection in Tajikistan, 2009



Ergonul O, et al. WHO report, 2009

Crimean-Congo Hemorrhagic Fever among Health Care Workers, Turkey

Aysel Kocagul Celikbas, Başak Dokuzoğuz, Nurcam Baykam, Sebnem Eren Gok, Mustafa Necati Eroğlu, Kenan Midilli, Herve Zeller, and Onder Ergonul

Table 1. Clinical and laboratory findings of HCWs in whom Crimean-Congo hemorrhagic fever developed after occupational exposure, Turkey, 2004–2011*†

HCW, outcome	Body temperature, °C	Bleeding	Leukocytes/ mm^3	Platelets/ mm^3	AST	ALT	APTT	Fibrinogen	SSI
1, survived	38.5	No	800	42,000	425	346	44	225	Moderate
2, survived	37.2	No	1100	53,000	145	81	43	270	Mild
3, died	40.5	Ecchymosis, hematemesis, melena, hematuria	11,100	40,000	251	277	90	171	Severe
4, survived	40.5	No	2,900	78,000	150	110	37.4	250	Mild
5, survived	39	Epistaxis	1,800	58,000	167	129	64	218	Moderate
6, survived	40.5	No	1,800	44,000	123	216	40.5	165	Moderate
7, survived	39.1	No	3,100	13,000	418	132	40.9	170	Moderate

*HCW, health care worker; AST, aspartate aminotransferase; ALT, alanine aminotransferase; APTT, activated partial thromboplastin time ; SSI, severity score index.
†Reference values: leukocytes, 4,000–11,000/mm^3; platelets, 150,000–450,000/mm^3; AST, <50 IU/L; ALT, <50 IU/L; APTT, 24–36 sec; fibrinogen, 200–400 mg/dL.

Emerg Infect Dis 2014

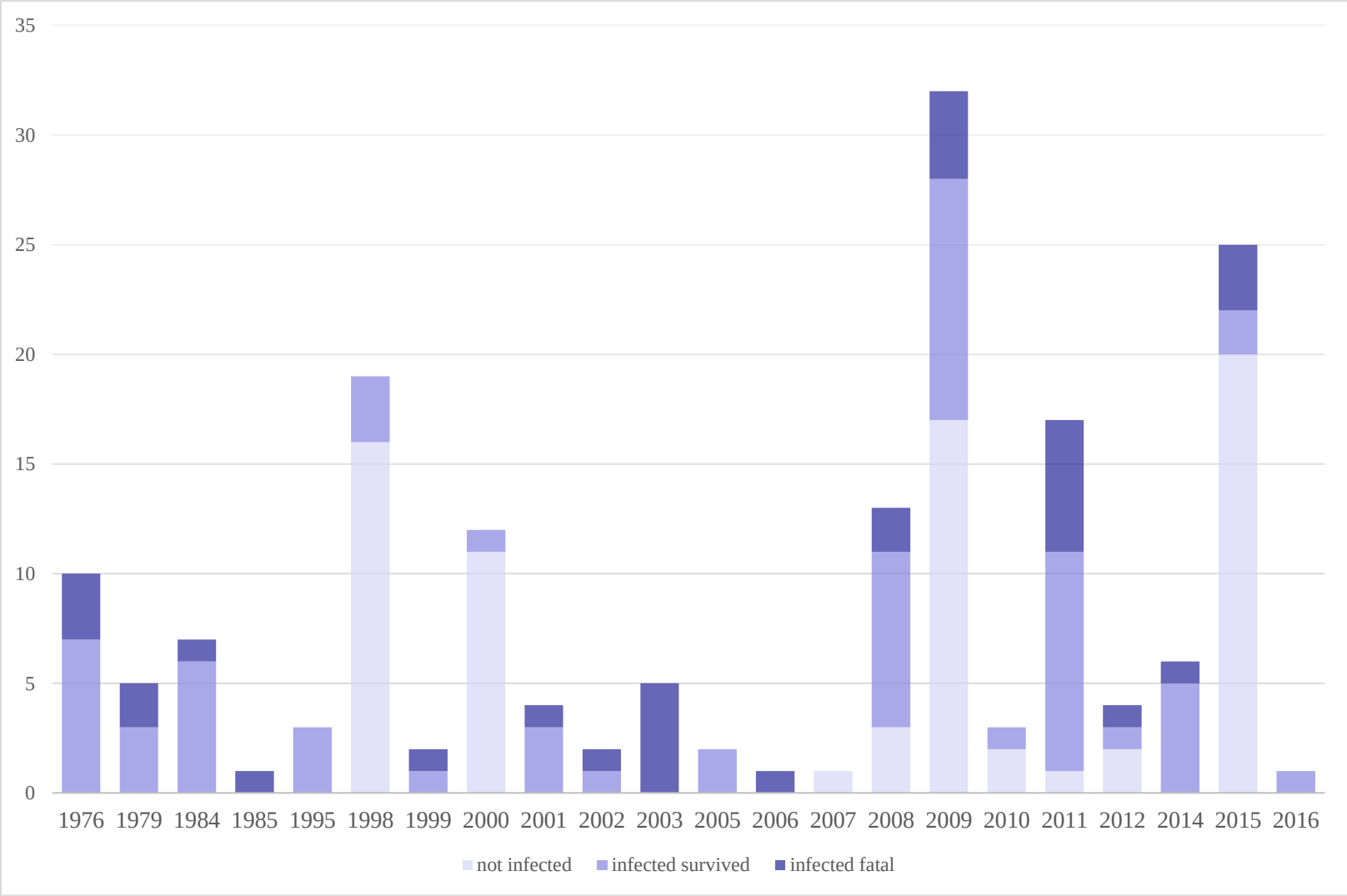
Table 2. Demographic features of HCWs with occupational exposure to Crimean-Conger hemorrhagic fever virus, Turkey, 2004–2011*

Episode, outcome†	HCW age, y/sex/profession	Procedure	Transmission route	Ribavirin for postexposure prophylaxis	Ribavirin for therapy (no. d after symptom onset)	Fatal
Episode 1; survived, her baby died	36/M/nurse	Wound care	Contact with surgical wound without protective equipment	No	Yes (0)	No
	31/F/nurse	Intubation, aspiration	Aerosol and droplet and contact without protective equipment	No	No	No
Episode 2; died	28/F/nurse	Phlebotomy	Needlestick	No	Yes (3)	Yes
Episode 3; died	41/M/physician	Resuscitation	Aerosol and droplet	–	Yes (0)	No
	26/M/physician	Nasal tamponade	Indirect contact	–	Yes (0)	No
	29/M/physician	Nasal tamponade	Indirect contact	–	Yes (0)	No
Episode 4; survived	30/M/nurse	Phlebotomy	Needlestick	No	Yes (1)	No
Episode 5; survived	30/F/nurse	Phlebotomy	Needlestick	Yes	–	No
Episode 6; survived	24/F/physician	Phlebotomy	Needlestick	Yes	–	No

*HCW, health care worker; –, ribavirin not necessary.
†Outcome for the index case-patient in each episode.

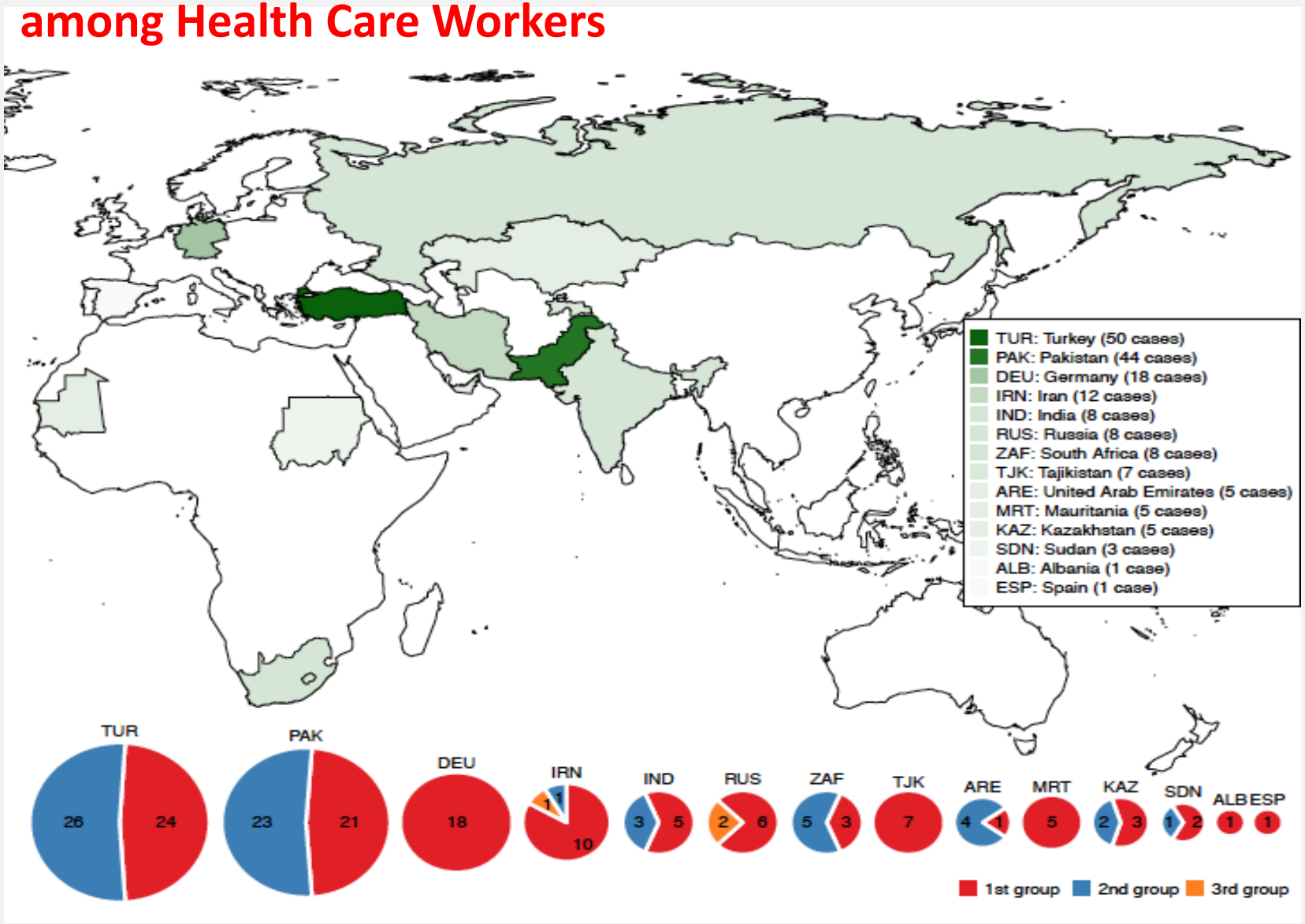
Emerg Infect Dis 2014

Crimean-Congo Hemorrhagic Fever among Health Care Workers



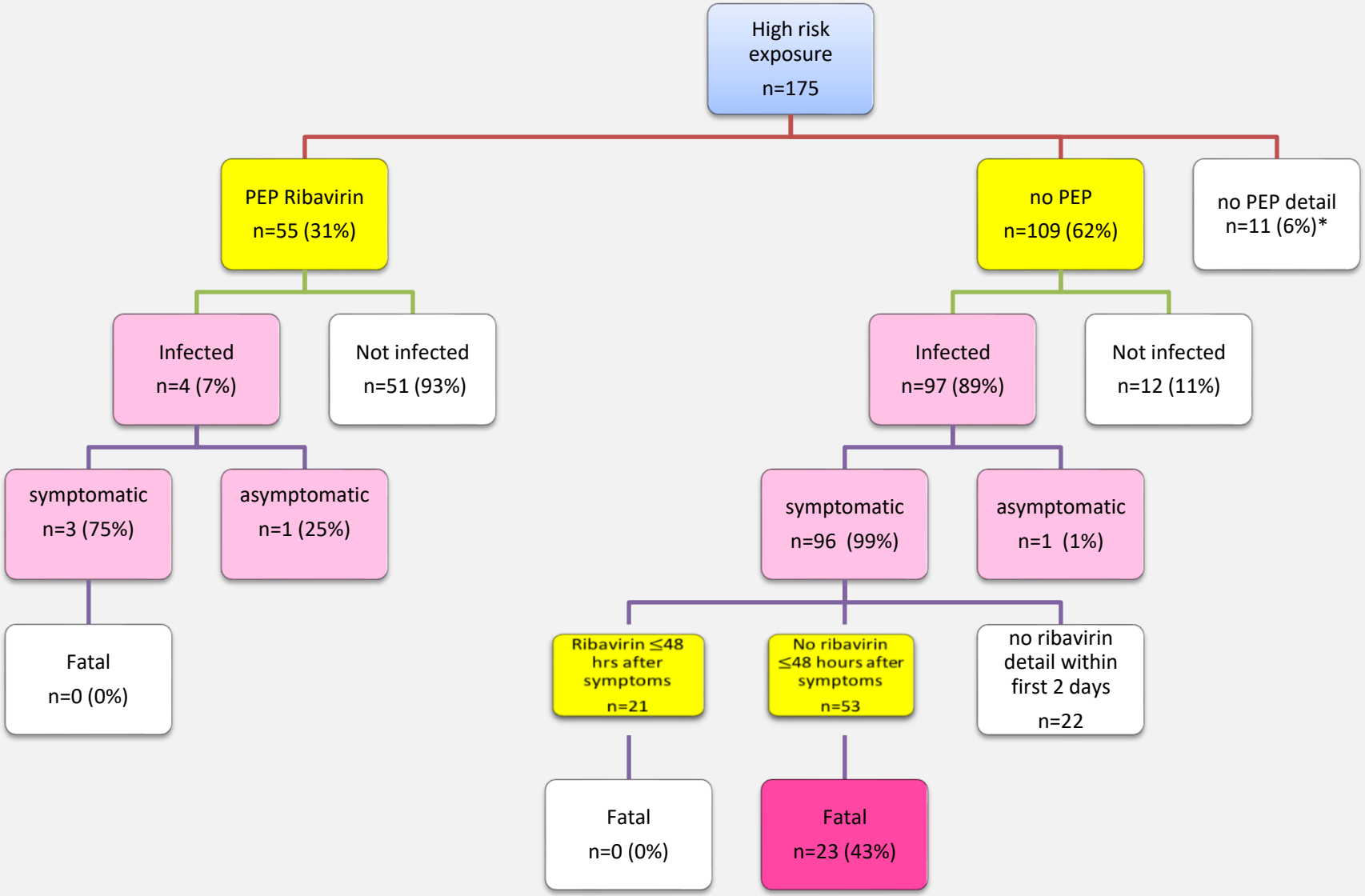
Ergönül, *Emerg Infect Dis* 2018

Systematic Review of Crimean-Congo Hemorrhagic Fever among Health Care Workers



Ergönül, *Emerg Infect Dis* 2018

Crimean-Congo Hemorrhagic Fever among Health Care Workers

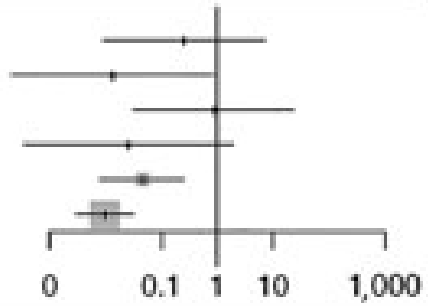


Ergönül, *Emerg Infect Dis* 2018

Ribavirin use among Health Care Workers

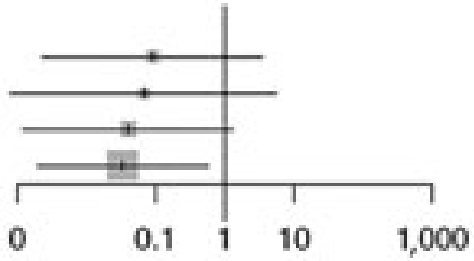
A

Study (reference)	PEP Infected	PEP Not infected	No PEP Infected	No PEP Not infected	OR (95% CI)
Altaf et al. (*16*)	0	2	3	4	0.26 (0.01–7.27)
Celikbas et al. (*6*)	0	2	7	0	0.01 (0–0.87)
Conger et al. (*7*)	2	14	0	2	0.86 (0.03–23.84)
Guner et al. (*8*)	0	6	1	0	0.03 (0–1.90)
Nadari et al. (*34*)	0	6	1	0	0.03 (0–1.90)
Pooled estimate (4 studies)	2	24	11	6	0.05 (0.01–0.26)
Pooled estimate (all studies)	4	51	98	12	0.01 (0–0.03)



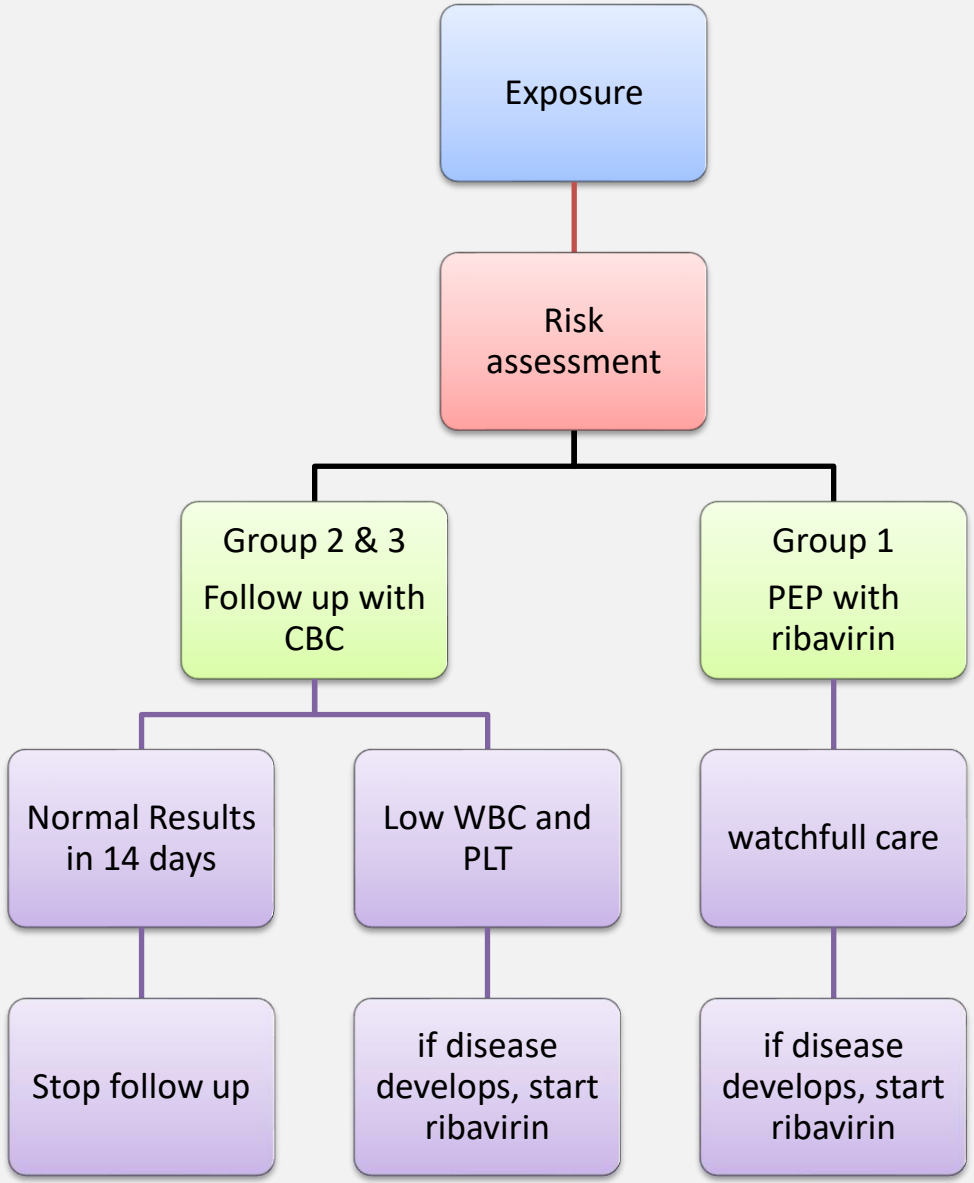
B

Study (reference)	Early ribavirin Fatal	Early ribavirin Survived	No early ribavirin Fatal	No early ribavirin Survived	OR (95% CI)
Celikbas et al. (*6*)	0	5	1	1	0.09 (0–3.59)
Nadari et al. (*34*)	0	2	1	0	0.07 (0–5.49)
Pooled estimate (2 studies)	0	7	2	1	0.04 (0–1.33)
Pooled estimate (all studies)	0	20	24	33	0.03 (0–0.58)



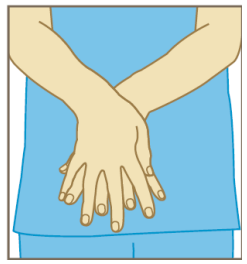
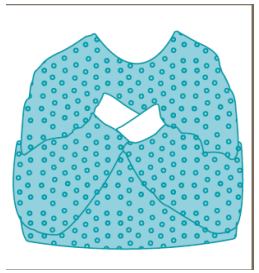
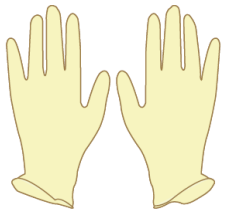
Ergönül, *Emerg Infect Dis* 2018

Crimean-Congo Hemorrhagic Fever among Health Care Workers



Hand hygiene and use of PPE based on risk assessment

- Always before and after patient contact, and after contact with contaminated environmental surfaces or equipment
- If direct contact with patient's blood and body fluids, secretions, excretions, mucous membranes or non-intact skin
- If there is a risk of spills onto the health-care worker's face


Рекомендуемый порядок снятия СИЗ
Помните о тех участках, где возможно загрязнение СИЗ, и не допускайте самозаражения при их снятии!
Пример: оказание помощи пациенту с птичьим гриппом
Снимите перчатки вместе с халатом (если халат одноразовый), выбросьте их.
Обработайте руки спиртосодержащим препаратом или водой.
Снимите защитные очки, НЕ прикасаясь к передней части.
Снимите респиратор, НЕ прикасаясь к передней части.
Обработайте руки спиртосодержащим препаратом или водой.
uvex
How to put on PPE (when all PPE items are needed)
Step 1
- Identify hazards & manage risk. Gather the necessary PPE.
- Plan where to put on & take off PPE.
- Do you have a friend? Mirror?
- Do you know how you will deal with waste?
Step 2
- Put on a gown.
Step 3a
- Put on face shield.
OR
Step 3b
- Put on medical mask and eye protection (i.e. eye visor/goggles).
Note: If performing an aerosol-generating procedure (e.g. aspiration of respiratory tract, intubation, resuscitation, bronchoscopy, autopsy), a particulate respirator (e.g. NIOSH-certified N95, EU FFP2, or equivalent respirator) should be used in combination with a face shield or an eye protection. Do user seal check if using a particulate respirator.
Step 4
- Put on gloves (over cuff).
How to take off PPE
Step 1
- Avoid contamination of self, others & the environment.
- Remove the most heavily contaminated items first.
Remove gloves & gown
- Peel off gown & gloves and roll inside out.
- Dispose of gloves and gown safely.
Step 2
- Perform hand hygiene.
Step 3a
If wearing face shield:
- Remove face shield from behind.
- Dispose of face shield safely.
Step 3b
If wearing eye protection and mask:
- Remove goggles from behind.
- Put goggles in a separate container for reprocessing.
- Remove mask from behind and dispose of safely.
Step 4
- Perform hand hygiene.

Primary prevention strategies for HCWs

1.Standard Precautions: Always using basic infection control practices (hand hygiene, safe injection practices, etc.) for all patients.
2.Transmission-Based Precautions: Implementing **Contact, Droplet, and/or Airborne Precautions** as appropriate for patients with known or suspected zoonotic infections (e.g., using N95 respirators, gowns, and gloves).
3.Personal Protective Equipment (PPE): Appropriate and consistent use and proper donning and doffing of PPE.
4.Vaccinations: Where available, vaccinating HCWs against specific zoonotic diseases if they are at high risk (e.g., Rabies vaccine for certain laboratory or high-exposure personnel).
5.Occupational Health Surveillance: Implementing systems for monitoring HCW exposures and illnesses.
6.Training and Awareness: Ensuring HCWs are educated on identifying potential zoonotic infections, especially those with high outbreak potential, and on the correct infection control protocols.
7.Environmental Controls: Applying strict guidelines for cleaning, disinfection, and sterilization of patient-care equipment and the environment.
8.Management of Animals in Healthcare: Strict infection control protocols must be in place for animal research facilities and for any animal-assisted therapy programs within the hospital.

Organization	Recommended Resource/Guideline	Relevance to HCWs and Zoonoses
World Health Organization (WHO)	Rabies Fact Sheets and Guidelines	Provides the global standard for post-exposure prophylaxis (PEP) and the protocols HCWs follow after potential exposure.
U.S. Centers for Disease Control and Prevention (CDC)	Guidelines for Isolation Precautions (e.g., HICPAC)	Outlines Standard, Contact, Droplet, and Airborne Precautions which are the core strategies HCWs use to manage patients with highly contagious zoonoses like Ebola or Avian Influenza.
U.S. Centers for Disease Control and Prevention (CDC)	Infection Control Guidance for Specific Zoonoses	Dedicated pages for diseases like Brucellosis, Q Fever, Hantavirus, and Emerging Coronaviruses often include sections on healthcare settings and occupational exposure prevention.
Occupational Safety and Health Administration (OSHA)	Bloodborne Pathogens Standard	Directly relevant for any zoonoses (like Ebola or CCHF) that pose a risk of transmission through exposure to blood or other potentially infectious materials.

Summary

Highest-risk groups

Laboratory personnel, infectious disease units, veterinarians, and emergency staff.

Key zoonotic threats in healthcare

Brucella, *Coxiella*, *Francisella*, *CCHF virus*, *SARS-CoV-2*, and *Mycobacterium bovis*.

Preventive measures

Vaccination (rabies, influenza), BSL-3 lab containment, PPE during specimen handling, and rapid post-exposure management.

KUISCID

KOÇ UNIVERSITY - İŞBANK
CENTER FOR INFECTIOUS DISEASES

Önder Ergönül, MD, MPH, FESCMID

KUISCID
KOÇ UNIVERSITY - İŞBANK
CENTER FOR INFECTIOUS DISEASES

2019
COVID -19

2021

Present

KUISCID was established in December 20 of 2020

Faculty

Prof. Önder Ergönül, MD. MPH, FESCMID.
Director of KUISCID
Infectious Diseases and Epidemiology

Prof. Füsun Can, MD.
Vice Director of KUISCID
Chair, Medical Microbiology Department

Prof. Sibel Sakarya, MD.
Chair, Department of Public Health

Şiran Keske, MD.
ESGREV
Infectious Diseases
Clinical Research

Mert Kuşkucu,PhD
Clinical Viriology

İlker Kayı, MD.
Public Health

Selçuk Özger, MD
Infectious Diseases
Clinical Research

Özlem Doğan, MD.
Clinical Mycology

Bahar Madran,PhD.
Public Health

Postdoctoral Researchers

Nazlı Ataç, PhD.

Cansel Vatansever, PhD.

Anı Akpınar, PhD.

Abdou Allayeh, PhD.

Clinical Residents

Pelin İrkören, MD. (**Alumni**)

Lal Sude Gucer, MD.

Oğuz Usta, MD.

Yağmur Abik, MD.

Administrative Staff

Pınar Yazıcı Yaman

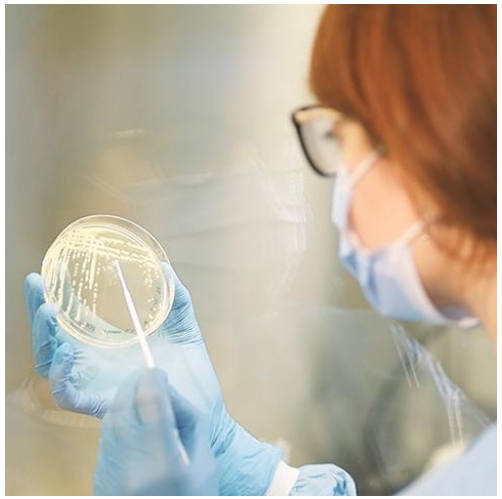
Tayfun Barlas

KUISCID Infrastructure

BSL2

BSL3

ANCIENT MICROBIOLOGY RESEARCH



MYCOLOGY LAB.

Research Area

Viruses

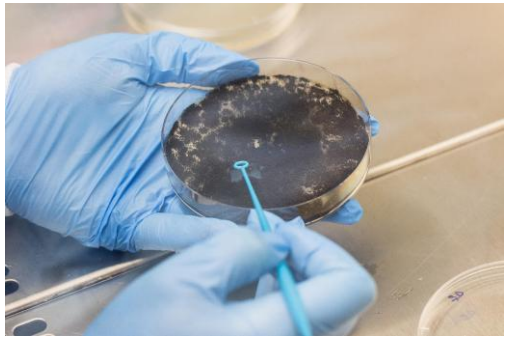
- Shedding dynamics
- Diagnostics
- Drug studies

Bacteria and antibiotic resistance

- Resistance epidemiology
- Antimicrobial stewardship
- Biofilm-related infections
- Virulence factors
- Bioinformatics

Immune response

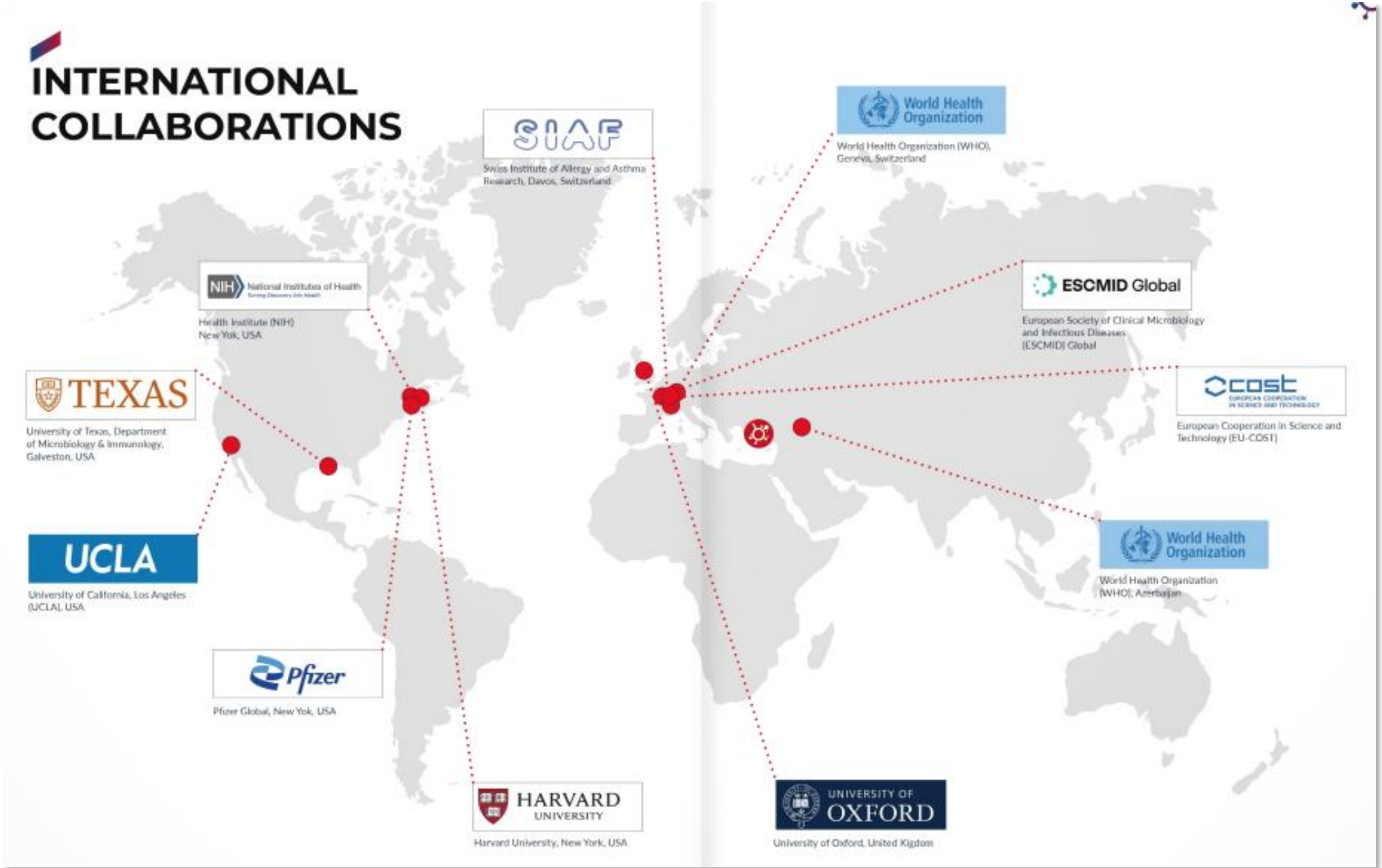
- Neutralizing antibody responses to viral infections
- T-cell response to viral infections
- Neutrophil response to bacterial infections



Fungi

- Antifungal resistance
- Fungal virulence factors

INTERNATIONAL COLLABORATIONS



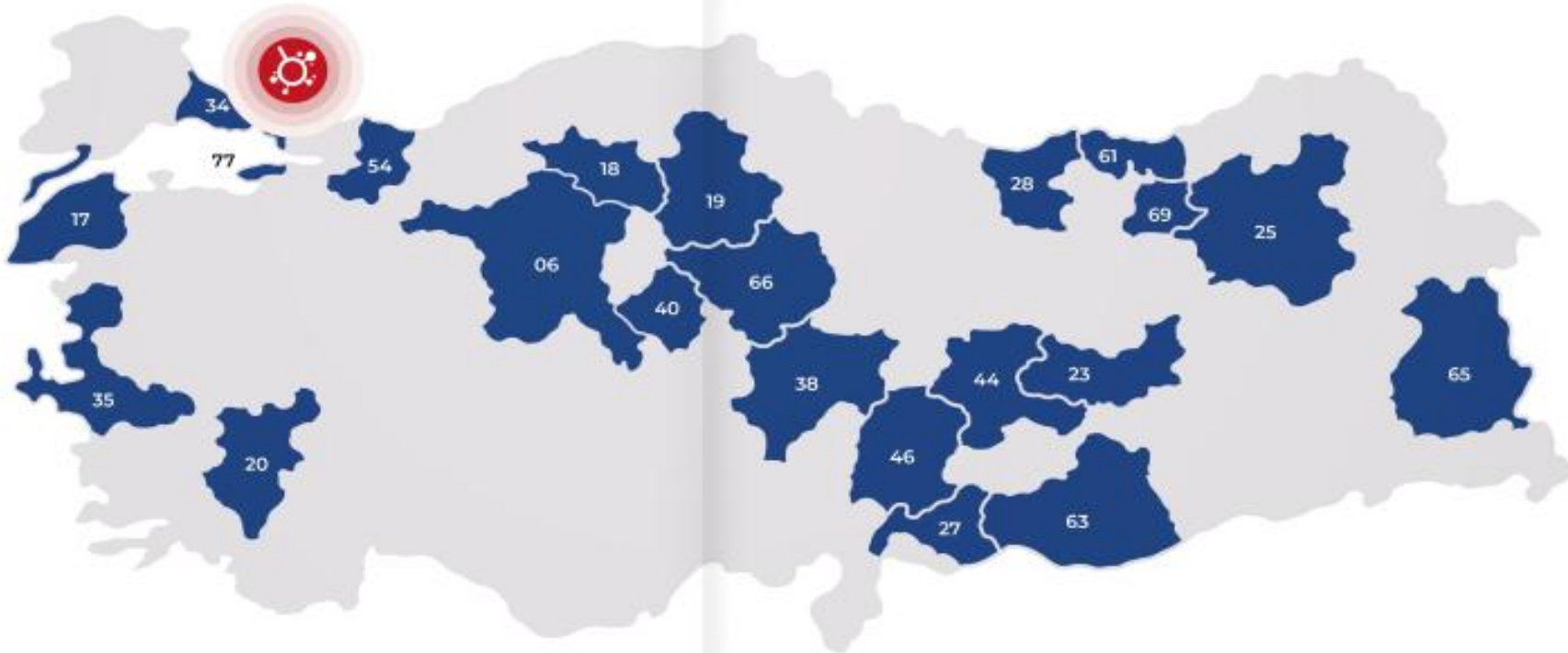
NATIONAL COLLABORATIONS

2 Associations

13 Hospitals

21 Universities

37 TOTAL



06 Ankara University
25 Atatürk University
06 Başkent University
69 Bayburt Public Hospital
66 Bozok University
17 Çanakkale 18 Mart University
18 Çankırı Public Hospital
35 Dokuz Eylül University
35 Ege University
23 Elazığ Fethi Sekin Pub. Hosp.
38 Erciyes University
25 Erzurum City Hospital
23 Fırat University
27 Gaziantep University
28 Giresun University
06 Hacettepe University
19 Hitit University
34 İstanbul University
34 İstanbul University Cerrahpaşa
35 İzmir Katip Çelebi University Atatürk EAH
46 Kahramanmaraş Sütçü İmam University
61 Karadeniz Technical University
40 Kırşehir Ahi Evran University
34 Koşuyolu High Specialization Education And Research Hospital
44 Malatya Training and Research Hospital
34 Marmara University
20 Pamukkale University
34 Sağlık Bilimleri University
54 Sakarya University
33 Şişli Etfal Research and Training Hospital
34 Turkish Society of Microbiology (TMC)
34 Turkish Society of Clinical Microbiology and Infectious Diseases (KLIMIK)
63 Şanlıurfa Public Hospital
34 Ümraniye Research and Training Hospital
65 Van Research and Training Hospital
77 Yalova Public Hospital
66 Yozgat City Hospital

COVID-19

9 MAR 2020

COVID-19 meeting in İş Kuleler.

11 MAR 2020

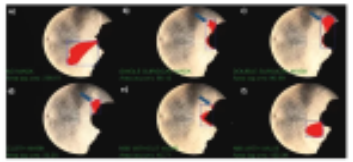
First cases of COVID-19 in Türkiye

JUN 2020

Isolation of the virus in KUISCID BSL-3 lab. Appropriate use of masks

IJID

Effectiveness of different types of Masks in Aerosol Dispersion in SARS-CoV-2 Infection. International Journal of Infectious Diseases.



2021

Role of our scientific output on treatment

IJID

Appropriate use of tocilizumab in COVID-19 infection. International Journal of Infectious Diseases.

Ministery of Health includes our Favipiravir study in their adult patient guideline

Effectiveness of favipiravir in COVID-19: a live systematic review.

Our publication of the first variant

IDCM

First report of SARS-CoV-2 gamma variant in Turkey. Infectious Diseases and Clinical Microbiology.

2022

COVID-19 Diagnostic kit

We have developed a COVID-19 diagnostic kit for daily usage. The kit was designed by Koç University researchers and awarded as "The Best Patent".

COVID-19 Symposium

Our Experience, What we learnt and Our Contribution

2023

Our publication comparing rapid, safe and unique diagnostic tests

SPIE. DIGITAL LIBRARY

Clinical validation of SERS metasurface SARS-CoV-2 biosensor. Biomedical Vibrational Spectroscopy.

Vaccine efficency in our country

Allergy

Effect of BTN162b2 and Coronavac boosters on humoral and cellular immunity of individuals previously fully vaccinated with Coronavac against SARS-CoV-2: A longitudinal study. Allergy.

A pioneering study about the impact of shedding and required precautions for new variants

CMI

Duration of infectious shedding of SARS-CoV-2 omicron variant and its relation with symptoms. Clinical Microbiology and Infection.

Developing a strategy for vaccine efficiency studies to be applied in all laboratories

Bioanalysis

Development of pseudotyped VSV-SARS-CoV-2 spike variants for the assessment of neutralizing antibodies. Bioanalysis

Early detection systems for respiratory viruses

ENVIRONMENTAL MICROBIOLOGY

Surveillance of respiratory viruses by aerosol screening in indoor air as an early warning system for epidemics. Environmental Microbiology

International COVID-10 guidelines

Azerbaijan: World Health Organization (WHO), Diagnostics and Treatment Guideline (2021)

Kosovo: Training of medical doctors (September 2021)

Bosnia and Herzegovina: Training of medical doctors (May 2021)

CCHF in Europe: 2013-2025

	Bulgaria	Spain	Portugal	Macedonia	Total
2013	2/8	1			2/9
2014	1/8 + 1 (UK)				1/9
2015	2/4				2/4
2016	4	1/2			1/6
2017	2				2
2018	1/6 + 1 (GR)	1/2			2/9
2019	2				2
2020	1	1/3			1/4
2021		2			2
2022	1/2	1/2			2/4
2023	3	1		1/3	1/7
2024	1	2/4	1/1		2/6
2025		1			
Total	7/43 (18%)	6/18(33%)	1/1	1/3 (33%)	15/65 (23%)

CRIMEAN CONGO HEMORRHAGIC FEVER

2007

Crimean Congo Hemorrhagic Fever book written by Önder Ergönül was published.

Crimean-Congo Hemorrhagic Fever. Edited by. Önder Ergönül and Chris A. Whitehouse. Published by Springer, 2007

2022

Collaboration of Hitit and Koç University for "Crimean Congo Hemorrhagic Fever"

Virus was isolated. Studies were initiated for developing rapid and safe diagnostic kits.

2023

Türkiye Consortium of Crimean Congo Hemorrhagic Fever was established.

Networking of the working groups were initiated and a meeting was held in KUISCID.

2024

Findings of the treatment studies were presented in ESCMID 2024.

Risk factors of crimean Congo Hemorrhagic Fever

ESCMID

Key predictors of critical illness and mortality in Crimean-Congo Haemorrhagic Fever

New international project: Birds, Ticks and Humans From Congo to Crimea to Europe. (UCLA)

CCHF Research at National and International Level

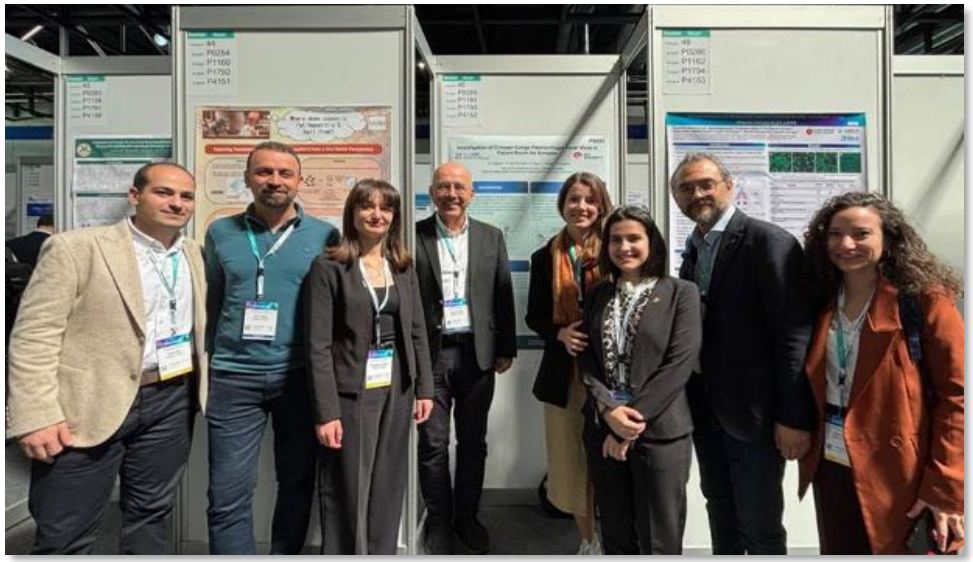
Erzurum, Türkiye 2024

Key predictors of critical illness and mortality in Crimean-Congo Haemorrhagic Fever

Fatihan Pınarlık, MD.
PhD candidate

Deniz Güllü, MD- PhD Student

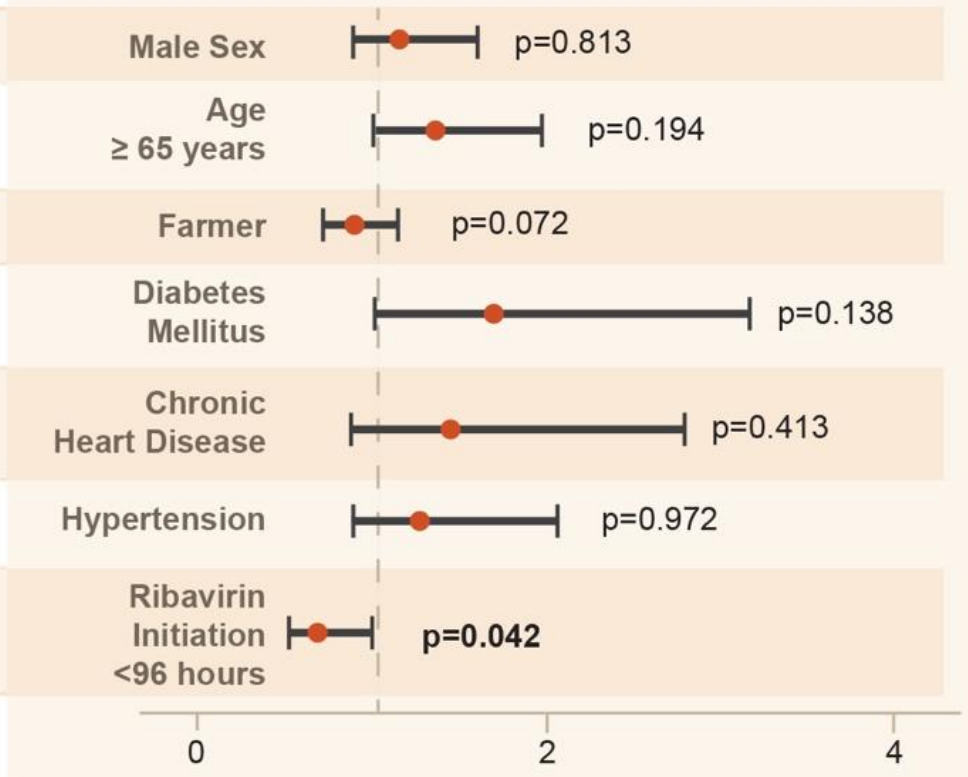
Defne Yığcı, Undergraduate Student



ESCMID Global, Vienna 2025

Predictors of ICU Admission

Variable	ICU Admission OR	95% CI	p-value
Male Sex	1.059	0.660 -1.669	0.813
Age ≥ 65 years	1.390	0.846-2.284	0.194
Farmer	0.642	0.397-1.040	0.072
Diabetes Mellitus	1.817	0.825-4.003	0.138
Chronic Heart Disease	1.438	0.603-3.430	0.413
Hypertension	0.986	0.443-2.192	0.972
Ribavirin Initiation <96 hours	0.557	0.317-0.987	**0.042**



- 18 centers, 1103 lab confirmed cases (2019-2024)
- ICU Admission 8%
- Case fatality rate 5.1%

Güllü D, ark. CMI 2025

CCHF Survivors Project

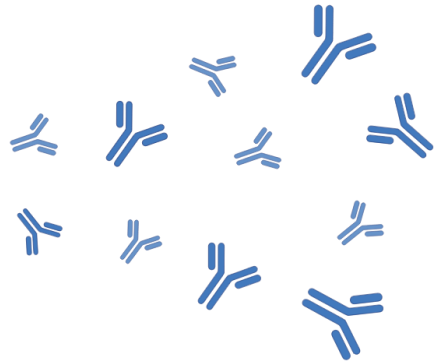
Hospital A
n = 1056

Hospital B
n = 1076

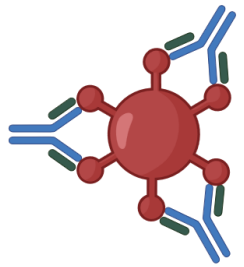
CCHF Survivors called by researchers
n = 2132

CCHF Survivors volunteered for the study
n = 104

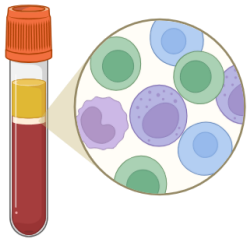
Serum Collection



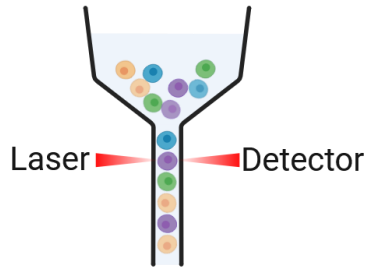
Investigation of anti-CCHFV antibodies by ELISA



Investigation of neutralizing antibodies by plaque assay



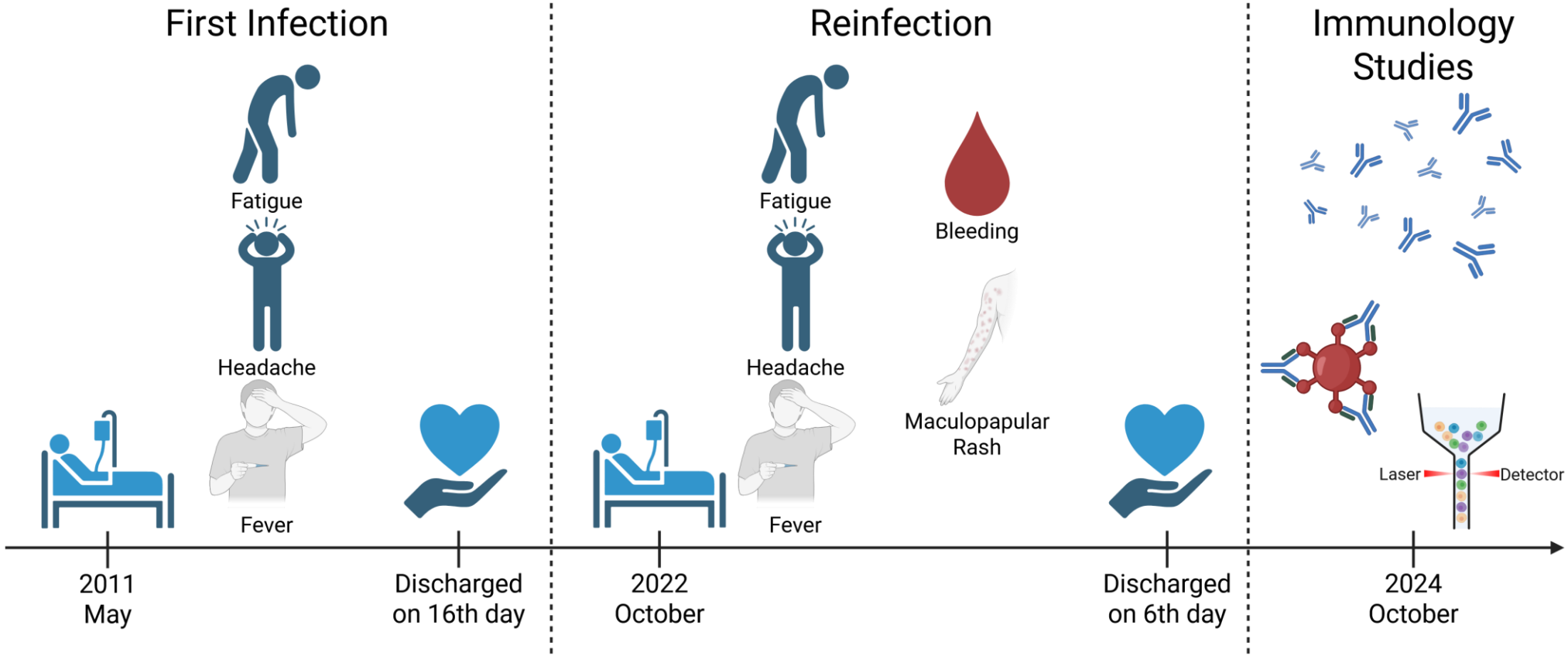
PBMC Collection



Investigation of antigen specific memory T cells by flow cytometry

Breaking News!

- Current information: CCHFV infection provides lifelong immunity
- We discovered a case reinfected with CCHF virus



KUISCID ECOLOGICAL RESEARCH NETWORK

KUISCID
KOÇ UNIVERSITY - İŞBANK
CENTER FOR INFECTIOUS DISEASES

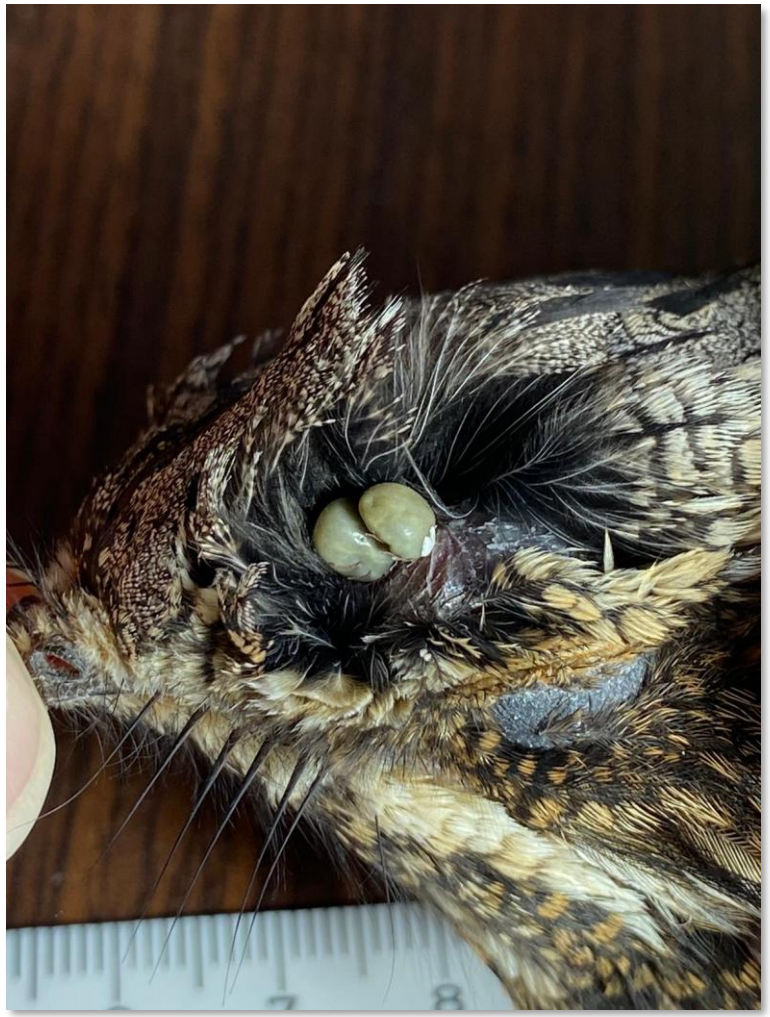
THE UNIVERSITY OF CALIFORNIA
UCLA

İSTANBUL ÜNİVERSİTESİ CERRAHPAŞA

MARMARA ÜNİVERSİTESİ

TEKİRDAĞ NAMIK KEMAL ÜNİVERSİTESİ
2006

KUISCID ECOLOGICAL RESEARCH NETWORK



WEST NILE FEVER

2019

- West Nile Fever, mortality rate >%10
- A serious threat for İstanbul.
- Requires preparedness for summer terms.

2020

KUISCID was established

2021

Epidemiologic studies were initiated and collaboration was started with İBB Vector Control Committee

2024

High number of cases in Türkiye especially in Western regions and İstanbul

Summary of current national situation

ESCMID West Nile Virus infections in Türkiye

National meeting, 20 December 2024 KUISCID

Ongoing studies for diagnostics and treatment

European Journal of Clinical Microbiology & Infectious Diseases
https://doi.org/10.1007/s10096-025-05135-3

RESEARCH

Emerging West Nile virus infections in Türkiye

Özlem Alhan[1] · Meliha Meriç Koç[2] · Ayşe Batırel[3] · Emel Yılmaz[4] · Gülden Ersöz[5] · Mehtap Aydın[6] · Merve Üstüner Doğan[7] · Hande Hazır Konya[8] · Üner Kayabaş[9] · Ferit Kuşçu[10] · Zehra Çağla Karakoç[11] · Meryem Şahin Özdemir[2] · Ali Okay Elibol[2] · Esra Kazak[4] · İdil Karaca[5] · Mert Ahmet Kuşkucu[12] · Önder Ergönül[13]

Received: 8 March 2025 / Accepted: 18 April 2025

Abstract

Purpose Türkiye experienced its largest West Nile virus (WNV) infection outbreak in 2024. We described the clinical and laboratory features of human cases with WNV infection collected from eleven tertiary hospitals in Türkiye in 2024.

Methods The clinical characteristics of the patients were gathered using a structured form in the retrospective study. According to the ECDC case definition of WNV infections, the patients were classified as 'confirmed' or 'probable' cases. The odds ratio (OR) and 95% confidence interval (CI) for possible mortality predictors in WNV infections were calculated using multivariate logistic regression analysis. $p < 0.05$ was considered statistically significant.

Results The mean age of the 51 patients was 63.3 ± 13.6 years, and 37 (72.5%) were male. Twenty-six cases (51%) were confirmed, and 49% were probable WNV infection. Forty-eight patients (94.1%) had WNV neuroinvasive disease: 24 (47%) were diagnosed with meningoencephalitis, 20 (39.2%) with encephalitis, one (2%) with meningitis, and seven (13.7%) with acute flaccid paralysis. Twenty patients (39.2%) had movement disorders (tremor, myoclonus, bradykinesia, or rigidity). The case fatality rate was 17.6%. In multivariate analysis, older age (OR: 1.09, CI: 1.03–1.19, $p = 0.042$) and secondary bacterial infection during hospitalization (OR: 10, CI: 1.55–64.95, $p = 0.015$) were associated with fatality.

Conclusion We highlighted the increasing number of cases and diagnostic challenges by describing the highest number of the patients with WNV infections in Türkiye. Raising awareness among healthcare professionals, facilitating access to diagnostic tests, and developing rapid, reliable, and easily applicable tests would enable early diagnosis and help improve outcomes.

Keywords Acute flaccid paralysis · Encephalitis · Meningoencephalitis · West nile virus infections · Vector-borne disease

Review > Curr Opin Infect Dis. 2025 Apr 1;38(2):143-149. doi: 10.1097/QCO.0000000000001091. Epub 2025 Jan 15.

Mpox primer for clinicians: what makes the difference in 2024?

Sama Mahmoud Abdel-Rahman [1], Büşra Zeynep Bayici [1], Şiran Keske [2 3], Mert Kuşkucu [2 4], Yasemin Özsürekçi [5], Anne W Rimoin [6], Alfonso J Rodriguez-Morales [7 8], Önder Ergönül [2 3]

Affiliations + expand

PMID: 39813011 DOI: 10.1097/QCO.0000000000001091

Abstract

Purpose of review: The 2024 mpox outbreak, primarily driven by the possibly more virulent clade Ib strain, prompted the WHO declaring it a public health emergency of international concern (PHEIC) on August 14, 2024. This review provides essential guidance for clinicians managing mpox cases, as it contrasts the features of the 2024 outbreak with those of the 2022 epidemic to support better clinical decision-making.

ANTIMICROBIAL RESISTANCE STUDIES

It is estimated that up to 10 millions of people will die due to antibiotic resistant infections till 2050. Unfortunately, Türkiye stands as one of the countries to be affected the most due to these infections.

Monitoring the resistance

Scientific data obtained with 3 internationally funded projects.

1	Pfizer	Kapsar Project, Pfizer Global
2	University of Oxford	Wellcome Trust Project, Oxford University
3	University of Oxford	Balance Project, Oxford University

National network for fighting antimicrobial resistance

Within the scope of the Turkey Infectious Diseases Report (TEH), we have prepared guidelines according to Türkiye's resistance map to determine the choice of antibiotics in urinary tract, gastrointestinal system and respiratory tract infections.

A serious threat for Türkiye

High risk pathogens that we carry on our stuides

- Hypervirulant Klebsiella
- Acinetobacter baumannii
- Pseudomonas aeruginosa

Spread of high risk pathogens in Türkiye is monitorized.

Reasons of their being high risk are analyzed in detail via cell culture and in vivo experiments.

Bacterial vaccines

PLOS ONE

Resensitization to colistin results in rapid and stable recovery of adherence, serum resistance and ompW in Acinetobacter baumannii. PLoS One. 2024.

- Funded as a TUBITAK 1001 project.
- Target for bacterial vaccine is stated and in vivo studies were initiated.
- Studies for rapid diagnostics of high risk pathogens were initiated.

Our studies to eliminate antibiotic resistant bacteria and design novel therapy approaches

Our collaboration with Koç University Departments of Chemistry, Engineering and Physics continues. We already showed the antibacterial activities of various agents.

Broad spectrum antibacterial photodynamic and photothermal therapy achieved with indocyanine green loaded SPIONs under near infrared irradiation. Biomaterials Science. 2020.

Antibacterial type-II InP/ZnO quantum dots via multimodal reactive oxygen species. Chemical Engineering Journal. 2024

Selective antibacterial and antibiofilm activity of chlorinated hemi-cyanine against gram-positive bacteria. Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy. 2024.

Especially for urinary tract infections, we designed an antibiotic cargo system to effectively release the drug once it interacted with the bacteria.

Fimbria targeting superparamagnetic iron oxide nanoparticles enhance the antimicrobial and antibiofilm activity of ciprofloxacin against quinolone-resistant E. coli. Microbial Biotechnology. 2023

We tested the antibacterial activity of silver nanoparticles within a TUBİTAK 1001 project and obtained promising results in vivo.

ANTIMICROBIAL RESISTANCE

A serious threat for Türkiye

- Hypervirulant Klebsiella
- Acinetobacter baumannii
- Pseudomonas aeruginosa

ANCIENT MICROBIOLOGY
RESEARCH LABORATORY

: 24I/480
ti : 18/12/2024
: 08/02/2025

(x) Şahit numune alınmamıştır

	Takvim Yaşı Aralıkları (2σ)
filtre	MS 1032 - 1158 (%95,4)

yapılmış Karbon-14 yaşıdır.

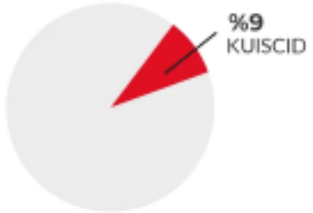
OUR RANKING OF SCIENTIFIC OUTPUT IN TÜRKİYE

A total of 3349 scientific studies in Türkiye, in the field of infectious diseases and microbiology with at least one author from Türkiye were published in the journals registered in the "Web of Science" (WOS) between January 1, 2020 and November 20, 2024.

The main problem in Türkiye is the lack of scientific contribution through qualified publications. KUISCID pioneers to this contribution with published articles in the infectious diseases category in the first quarter of Türkiye. KUISCID researchers took part in 29 of 385 publications (8%) in total being 20 of 213 publications (9%) in the microbiology category. These figures point to the critical importance of our center in the production of high-quality scientific publications.

PUBLICATIONS OF TÜRKİYE IN INFECTIOUS DISEASES

Within the first quartile: 385

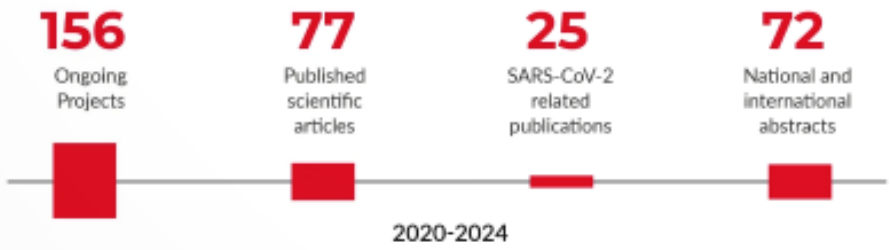


PUBLICATIONS OF TÜRKİYE IN MICROBIOLOGY

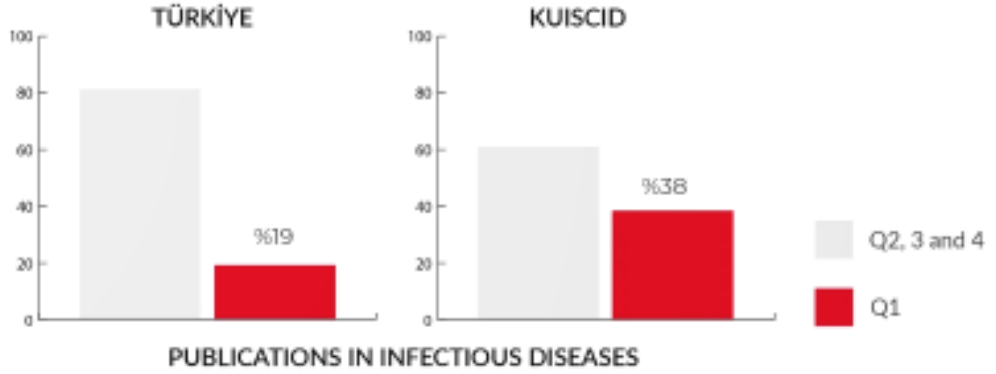
Within the first quartile: 213

ACCEPTED ABSTRACT NUMBER OF TÜRKİYE BY ESCMID GLOBAL, 2023-2024

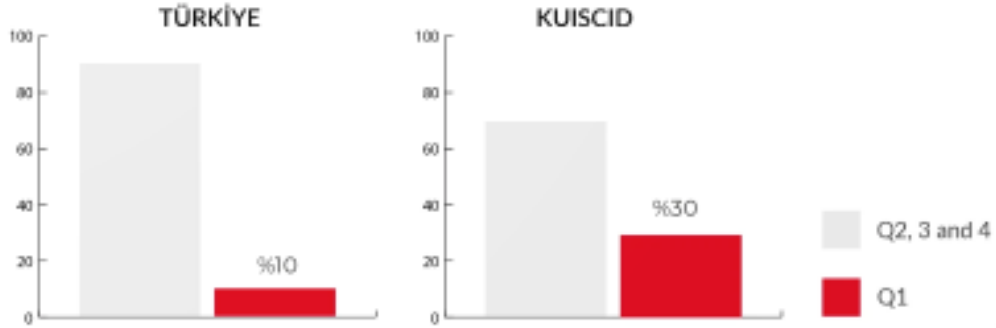
Total submitted abstract number: 182



In Türkiye, 19% of these publications are in the field of infectious diseases and 19% are in the field of microbiology. Ten percent of the articles were published in Q1 journals ranked with respect to their impact factor.



PUBLICATIONS IN INFECTIOUS DISEASES



PUBLICATIONS IN MICROBIOLOGY

In the same period, of the 91 studies in which KUISCID researchers were involved, 36% in the field of infectious diseases and 28% in the field of microbiology were published in Q1 journals. Compared to the Turkish average, our Q1 publication rate is 2 times higher in the field of infectious diseases and 3 times higher in the microbiology category.

TÜRKİYE INFECTIOUS DISEASES REPORT (TEH)

Web Page https://teh.kuiscid.org/

TEH MEETINGS

10 November 2023
ANAMED – İstanbul

09 January 2024
Zoom, Online Meeting

14 December 2023
Zoom, Online Meeting

09 February 2024
İş Mekan, İstanbul

31 May 2024
İş Kuleleri, İstanbul

11 October 2024
Hiton Hotel, İstanbul

The first phase of our website for the TEH Report is being completed. In the new period, we will modify the report further to increase science literacy for public health and publish a book that people from all fields can easily follow up the current situation in infectious diseases.

This project was implemented entirely with KUISCID's own resources. On our website, up-to-date information will be made available for the benefit of institutions such as the Ministry of Health, TÜBİTAK, TÜSEB and IMM, physicians and anyone who wishes to gain knwoledge.

21 CITIES

37 INSTITUTIONS

84 RESEARCHERS

TEH TÜRKİYE ENFEKSİYON HASTALIKLARI RAPORU

TEH WORKING GROUPS

- Antimicrobial stewardship
- Immunity
- COVID-19
- Gastrointestinal tract infections
- HIV and Sexually transmitted diseases
- Healthcare associated infections
- Central nervous system infections
- Respiratory tract infections
- Tuberculosis
- Urinarytractinfections
- Vector born diseases

Thank you

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