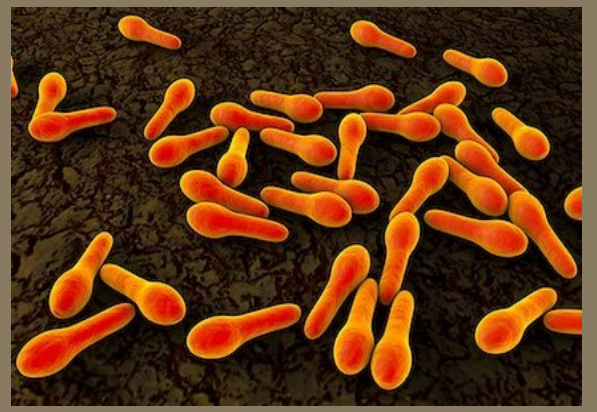
The NEW ENGLAND JOURNAL of MEDICINE

Tetanus — Forgotten but Not Gone

Jay P. Sanford, M.D.

March 23, 1995
N Engl J Med 1995; 332:812-813
DOI: 10.1056/NEJM199503233321209



Caterina Passalia, Dirigente Medico POU ASL3 Genovese
Paolo Bernuzzi, CFSMG Regione Liguria

J Laryngol Otol. 2004 Dec;118(12):974-6.

Tetanus: the 'forgotten disease'. A rare cause of dysphagia and trismus.

Tahery J[1], Morris DP, Birzgalis AR.

J Paediatr Child Health. 2011 Mar;47(3):152. doi: 10.1111/j.1440-1754.2011.02007.x.

Localised tetanus: rare presentation of a 'forgotten' disease.

Gupta V, Dewangan S, Dev Bhatia B.

Tidsskr Nor Laegeforen. 1992 Oct 10;112(24):3125.

...us--the forgotten disease].

...n Norwegian]

...F.

Bratisl Lek Listy. 2011;112(8):469-71.

A forgotten diagnosis in emergency department: tetanus.

Akdur O[1], Ozkan S, Durukan P, Koyuncu M, Ikizceli I, Metan G.

Harefuah. 1994 Jan 16;12...

[Tetanus--the forgotten disease].

[Article in Hebrew]

Waysbort J[1], Girsh-S...

...):1805.

Tetanus in the elderly: a forgotten illness.

Chaudhry R, Dhawan B, Mohanty S, Dey AB.

Pediatrics. 2016 Nov;138(5). pii: e20160298. Epub 2016 Oct 4.

Tetanus and Occam's Razor: Almost Forgotten but Not Gone: A Case Report.

Skuby SO[1,2], Rhee E[3], Thilo EH[4,2], Simões EA[4,5,6].

Bratisl L...

A forgotten diagnosis in emergency department: tetanus.

Akdur O[1], Ozkan S, Durukan P, Koyuncu M, Ikizceli I, Metan G.

Genovese
one Liguria

Vaccine 26 (2008) 3634–3639

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Appropriate tetanus prophylaxis practices in patients attending Emergency Departments in Italy☆

Rossella Abbate, Gabriella Di Giuseppe, Paolo Marinelli, Italo F. Angelillo*,
The Collaborative Working Group[1]

Department of Public, Clinical and Preventive Medicine, Second University of Naples, Via Luciano Armanni, 5, 80138 Naples, Italy

Only 1.5% of the physicians correctly adhere to the tetanus prophylaxis and immunization practices in wound management according to the Italian recommendations.

January 5, 1976

The Inexcusable Disease

Geoffrey Edsall, MD

JAMA. 1976;235(1):62-63. doi:10.1001/jama.1976.03260270048031

Nel 1890 Emil Von Behring e Kitasato Shibasaburo pubblicano «*Del verificarsi dell'immunità verso la difterite e il tetano negli animali*»

Nel 1901 Von Behring riceve il premio Nobel per la medicina per i suoi studi sulla «sieroterapia» antitetanica e antidifterica, il primo conferito nella storia.

Tetanus toxoid vaccines

TT vaccine was first produced in 1924 and used extensively for the first time among soldiers during World War II. Since then, immunization programmes using TTCVs have been highly successful in preventing MNT as well as injury-associated tetanus.

World Health Organization

World Health Organization

Organisation mondiale de la Santé

Tetanus vaccines: WHO position paper – February 2017

WHO position

The aims of tetanus vaccination are (1) to achieve global elimination of MNT and (2) to ensure lifelong protection against tetanus in all people by attaining and sustaining high coverage of 6 doses (3 primary plus 3 booster doses) of TTCV through routine childhood immunization schedules. The following recommendations provide updated guidance on vaccination schedules for primary and booster doses, according to age and population group.

Immunization in the case of injury

Although adequate vaccination should provide sufficient protection against tetanus, physicians may give a dose of TTCV, preferably Td, in the case of an injury in addition to other preventive measures as part of comprehensive wound management if the injury is severe or the patient's previous tetanus immunization history is unreliable. The immunization schedule should be completed as soon as possible for those who have not received all doses of TTCV required for lifelong protection.

In addition, passive immunization using TIG, preferably of human origin, may be needed for prophylaxis in cases of dirty wounds in incompletely immunized patients. TIG is essential in the treatment and prophylaxis of tetanus cases and should be readily available in all countries.

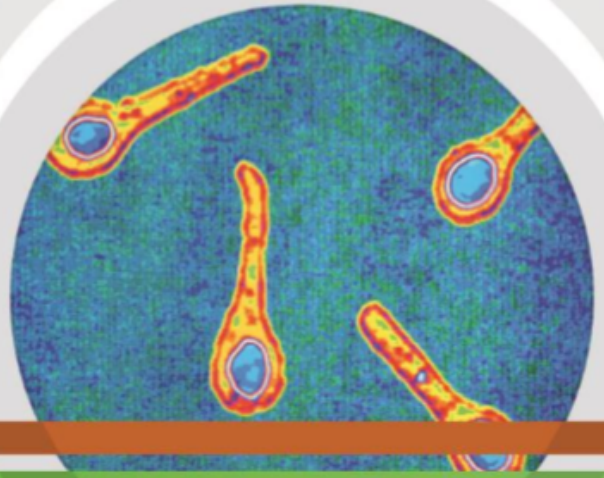
World Health Organization

Organisation mondiale de la Santé

Tetanus vaccines: WHO position paper – February 2017

In developing countries, where extensive efforts have been made to provide TTCVs in routine immunization programmes, in particular targeting children and pregnant women, the tetanus incidence has decreased in recent years.[10, 11] Innovative devices such as the single-

the true disease incidence.[7] In the European Union (EU), where most Member States have well-functioning immunization and surveillance systems, between 49 and 167 confirmed tetanus cases have been identified per year since 2006, with a declining trend. In 2014, the total reported tetanus incidence in the EU was 0.01 per 100 000 population, with 65% of cases aged ≥65 years.[8] The average annual incidence in the United States of America (USA) from 2001 to 2008 was 0.01 per 100 000 population. During that period, 30%, 60%, and 10% of reported cases were in persons aged ≥65 years, 20–64 years and <20 years, respectively, and the risk of dying from tetanus was 5 times greater in patients older than 65 years.[9]



ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

SURVEILLANCE REPORT

Annual Epidemiological Report for 2016

Tetanus

Distribuzione dei casi di tetano per Nazione e anno 2012-2016

Country	2012		2013		2014		2015		2016			
	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	ASR	Confirmed cases
Austria	.	.	.	.	.	.	.	.	.	.	.	.
Belgium	0	0.00	.	.	.	.	.	.	.	.	.	.
Bulgaria	2	0.03	1	0.01	0	0.00	0	0.00	4	0.06	0.05	3
Croatia	1	0.02	0	0.00	1	0.02	3	0.07	0	0.00	0.00	0
Cyprus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00	0
Czech Republic	0	0.00	0	0.00	0	0.00	1	0.01	1	0.01	0.01	1
Denmark	0	0.00	1	0.02	0	0.00	0	0.00	1	0.02	0.02	1
Estonia	0	0.00	1	0.08	0	0.00	0	0.00	0	0.00	0.00	0
Finland	.	.	.	.	.	.	.	.	.	.	.	.
France	5	0.01	10	0.02	4	0.01	12	0.02	4			
Germany	.	.	.	.	.	.	.	.	.			
Greece	7	0.06	5	0.05	2	0.02	6	0.06	3			
Hungary	5	0.05	2	0.02	2	0.02	3	0.03	5			
Iceland	0	0.00	0	0.00	0	0.00	0	0.00	0			
Ireland	1	0.02	1	0.02	1	0.02	1	0.02	0			
Italy	54	0.09	71	0.12	49	0.08	48	0.08	30			
Latvia	0	0.00	0	0.00	0	0.00	0	0.00	0			
Liechtenstein	.	.	.	.	.	.	.	.	.			
Lithuania	2				1	0.03	2	0.07	2			
Luxembourg	0				0	0.00	0	0.00	0			
Malta	0								0			
Netherlands	2								1			
Norway	1								0			
Poland	19				1				12			
Portugal	3								0			
Romania	7								6			
Slovakia	0				0	0.00	0	0.00	0			
Slovenia	1				6	0.29	3	0.15	2			
Spain	8	0.02	9	0.02	4	0.01	9	0.02	9			
Sweden	0	0.00	3	0.03	2	0.02	0	0.00	3			
United Kingdom	6	0.01	7	0.01	7	0.01	6	0.01	6			
EUWEEA	124	0.03	136	0.03	98	0.02	117	0.03	89			

Source: Country reports.

.: No data reported
ASR: Age-standardised rate.

Nel 2012 i casi notificati in Italia rappresentavano il 43,5% del totale europeo.

Nel 2016 i casi notificati rappresentavano il 33,7% del totale

Tetanus is rare in the United States, with approximately 27 cases reported annually from 2008 to 2012

Centers for Disease Control and Prevention. Notifiable diseases and mortality tables. MMWR Morb Mortal Wkly Rep 2013; 62:ND-86.

European Centre for Disease Prevention and Control. T
Annual epidemiological report for 2016. Stockholm: ECDC; 2018


ecdc
Number of cases
0
1
10
100
No data reported
EU/EEA member
Other countries

Vaccine 32 (2014) 639–644

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Tetanus in Italy 2001–2010: A continuing threat in older adults

Antonietta Filia[a,*], Antonino Bella[a], Christina von Hunolstein[b], Antonella Pinto[b], Giovanna Alfarone[c], Silvia Declich[a], Maria Cristina Rota[a]

[a] Infectious Diseases Epidemiology Unit, National Center for Epidemiology Surveillance e Health Promotion (CNESPS), Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy
[b] National Center for Research and Evaluation of Immunobiologicals, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy
[c] Department of Infectious, Parasitic and Immune-Mediated Diseases, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy

After excluding for multiple admissions for the same case, there were 932 admissions for tetanus.
Hospitalization rates were 1.8/1,000,000 population in northern Italy, 2.3/1,000,000 in central Italy and 1.0/1,000,000 in southern Italy.

Ratio of tetanus hospitalizations and reported tetanus cases, by year and geographical area, Italy 2001–2010.

	No. of tetanus hospitalisations*	No. of reported tetanus cases**	Ratio of hospitalisations to reported cases
Year			
2001	87	64	1. 4
2002	109	71	1.5
2003	106	66	1.6
2004	104	61	1.7
2005	80	53	1.5
2006	105	65	1.6
2007	89	57	1.6
2008	91	55	1.7
2009	88	56	1.6
2010	73	46	1.6
Total	**932**	**594**	**1.6**
Geographical area			
Northern Italy	465	319	1.4
Central Italy	258	152	1.7
Southern Italy	209	123	1.7
Total	**932**	**594**	**1.6**

Source of data: *National Hospital Discharge Database (NHDD), Ministry of Health, **statutory notification data, National Institute of Health (Istituto Superiore di Sanità-ISS).

Diagnoses are coded by using the nomenclature ofthe International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). We evaluated data regarding tetanus hospitalizations (code 037.0) in the years 2001–2010 Hospitalization rates were calculated by year, age group and gender and geographical area, was also calculated.

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[a] Infectious Diseases Epidemiology Unit, National Center for Epidemiology Surveillance e Health Promotion (CNESPS), Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy
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[c] Department of Infectious, Parasitic and Immune-Mediated Diseases, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy

The median age of hospitalized cases was 76 years (iqr 15).

14.8% (138/932) 45–64 years,

3.4% (32 cases) 25–44 years,

1.1% (10 cases) 15–24 years,

0.9 (8 cases) were children <15 years of age.

Only two of the latter had been reported to the statutory notification system

2 casi pediatrici nel 2017
7 aa F
10 aaM

Coperture per vaccinazioni previste entro i 24 mesi di età (Aggiornamento 28 febbraio 2018) a cura del Centro nazionale per la prevenzione delle malattie e la promozione della salute dell'Istituto superiore di sanità

COMPLIANCE AL PIANO VACCINALE

A livello nazionale le coperture vaccinali entro 2 anni di età sono elevate.
Tuttavia, quali informazioni abbiamo sull'esecuzione di richiami negli adolescenti e sulla copertura vaccinale degli adulti e degli anziani?

Gruppo di lavoro ICONA. ICONA 2008: Indagine di COpertura vaccinale NAzionale nei bambini e negli adolescenti. Roma: Istituto Superiore di Sanità; 2009. (Rapporti ISTISAN 09/29).

Review

Are current UK tetanus prophylaxis procedures for wound management optimal?

M W Cooke

- Simonsen et al showed that serum tetanus antitoxin titres gradually subside after immunisation. As a result, 28% of individuals, who had undergone full primary vaccination, had low antitoxin titres 25–30 years later. This decline in antitoxin titres may lead to older people having insufficient protection.
- Individuals who have received a complete five-dose vaccination course should have immunity to tetanus that persists for about 20 years. After this time, additional booster doses are given to travellers going to regions where medical attention is not available. This implies that using the UK regimen, those >35 years may experience reducing immunity

Copertura vaccinale antitetanica negli USA

Prevalence of population with correct tetanus vaccination coverage by age groups				
Age (Years)	Population	Correct tetanus vaccination coverage		
	n	N	%	IC al 95%
≥19	30865	19198	62,2	61.1-63.4
≥20-≤49	14212	8925	62,8	61.5-64.1
≥50-≤64	8324	5344	64,2	62.4-66.0
≥65	8329	4830	58,0	56.3-59.7

Estimated proportion of adults ≥19 years who received tetanus vaccination, by age group.

National Health Interview Survey, United States, 2016

Copertura vaccinale antitetanica in Spagna

Prevalence of population with correct tetanus vaccination coverage by age groups				
Age (Years)	Population	Correct tetanus vaccination coverage		
	n	N	%	IC al 95%
= 14	7	7	100	59-100
≥15-<25	103	83	80.6	71.6-87.7
≥25-<35	159	102	64.1	56.2-71.6
≥35-<45	132	79	59.8	51-68.3
≥45-<55	94	64	68.1	5.77-77.3
≥55-<65	102	82	80.4	71.3-87.6
≥65-<75	81	65	80.3	69.6-88.3
≥75	98	74	75.5	65.8-83.6
total	776	776	71.6	68.3-74.8

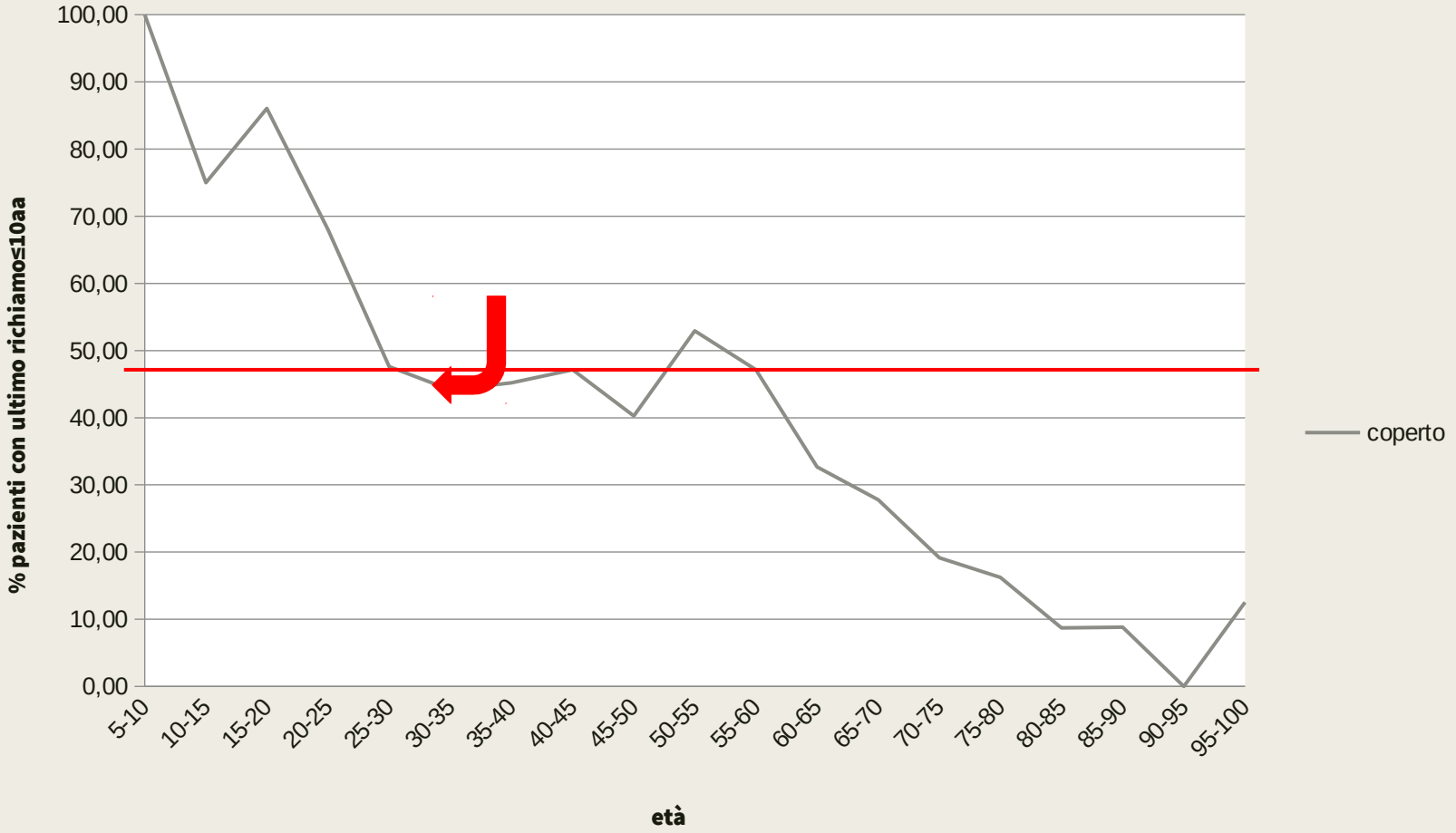
Moisés Robledo del Corro, Mariana Isabel Vargas-Román, Roberto Incio García, Ruth Gil Prieto & Ángel Gil de Miguel (2009) Tetanus vaccination in adult population:Coverage, registration and compliance, Human Vaccines, 5:2, 98-104, DOI: 10.4161/hv.5.2.6588

Studio retrospettivo osservazionale circa la copertura vaccinale antitetanica dei pazienti afferenti al PS Ospedale Villa Scassi a partire da Giu-16 a Set-17

- N=916pazienti
  - 381 pazienti vaccinati ed in regola con i successivi richiami (42%)
  - 535 non vaccinati o non in regola con i richiami (58%).

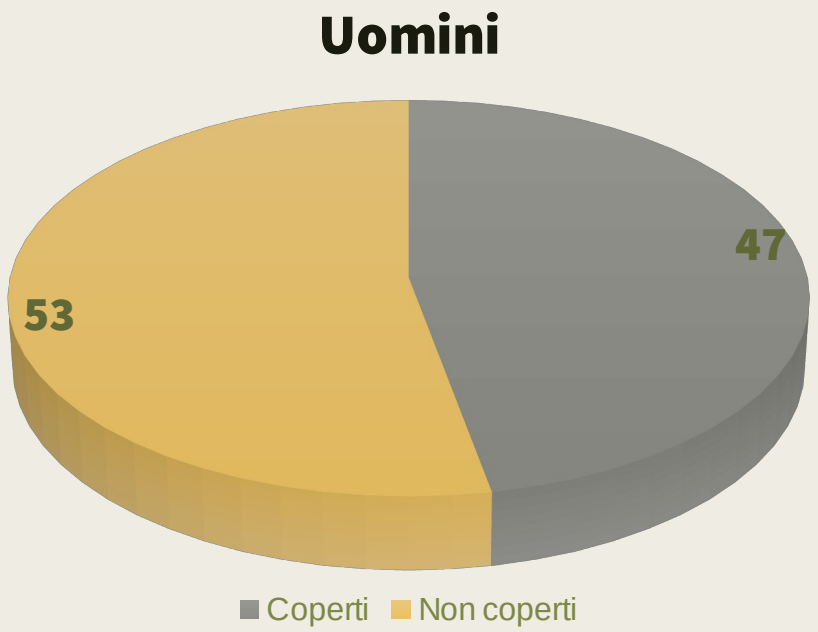
- 248 donne (27%)
  - 70 regolarmente vaccinate (28%)
  - 178 non vaccinate o non in regola con i richiami (72%)
- 668 uomini (73%)
  - 311 regolarmente vaccinati (47%)
  - 357non vaccinate o non in regola con i richiami (53%)

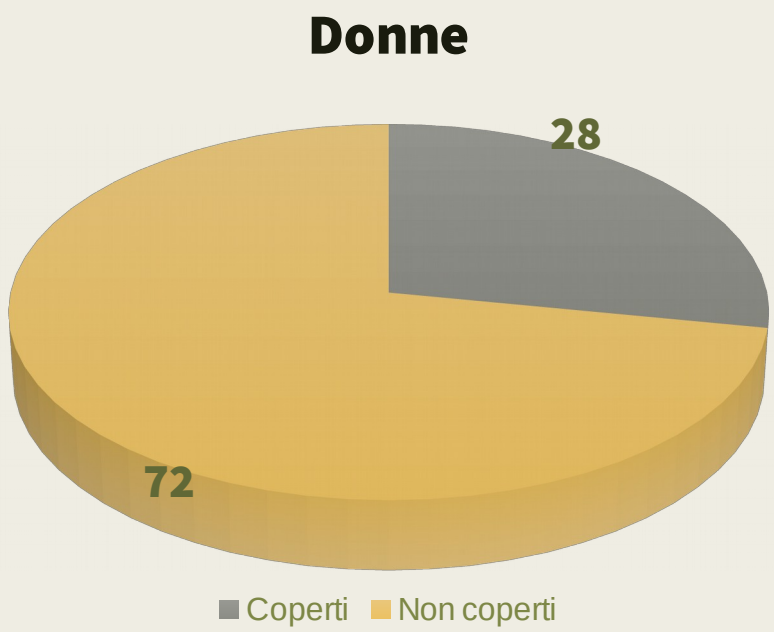
Copertura vaccinale antitetanica Osp. Villa Scassi, Genova



Dati ottenuti da 916 schede di pazienti afferenti al PS Osp. Villa Scassi nel periodo da Giu-16 a Set-17.

Copertura vaccinale antitetanica Osp. Villa Scassi, Genova





Dati ottenuti da 916 schede di pazienti afferenti al PS Osp. Villa Scassi nel periodo da Giu-16 a Set-17.

Durability of Vaccine–Induced Immunity Against Tetanus and Diphtheria Toxins: A Cross–sectional Analysis FREE

Erika Hammarlund ✉, Archana Thomas, Elizabeth A. Poore, Ian J. Amanna, Abby E. Rynko, Motomi Mori, Zunqiu Chen, Mark K. Slifka

Clinical Infectious Diseases, Volume 62, Issue 9, 1 May 2016, Pages 1111–1118,

L'emivita complessiva è risultata di 14 anni (IC 95%, 11-17). differenza non significativa (P = .59) nei tassi di decadimento degli anticorpi tra uomini e donne (emivita, 14 e 13 anni, rispettivamente) La durata dell'immunità protettiva è una funzione dell'ampiezza della risposta anticorpale e del tempo necessario per titoli anticorpali a scendere ai livelli non protettivi

Amanna IJ , Carlson NE, Slifka MK. Duration of humoral immunity to common viral and vaccine antigens. *N Engl J Med* 2007; 357:1903–15.

Against tetanus and diphtheria, the antibody responses waned more rapidly with half-lives of 11 and 19 years, respectively.

World Health Organization

Organisation mondiale de la Santé

Tetanus vaccines: WHO position paper – February 2017

Non esiste un indicatore immunologico per la protezione antitetanica.
Il valore soglia di anticorpi circolanti che garantisca immunità dipende dal test utilizzato

In vivo neutralization tests or modified enzyme-linked immunosorbent assays (ELISA), concentrations exceeding 0.01 IU/ml are usually considered protective

Antibody concentrations of at least 0.1–0.2 IU/ml are defined as protective when using standard ELISA techniques

Tuttavia dei casi di tetano sono stati descritti in pazienti con concentrazione anticorpale superior al valore soglia. Per cui una concentrazione generalmente considerata protettiva non rappresenta una garanzia assoluta di immunità

Lo scopo e di mantenere un'elevato titolo anticorpale nel corso di tutta la vita

Tetanus in Italy 2001–2010: A continuing threat in older adults

Antonietta Filia[a,*], Antonino Bella[a], Christina von Hunolstein[b], Antonella Pinto[b], Giovanna Alfarone[c], Silvia Declich[a], Maria Cristina Rota[a]

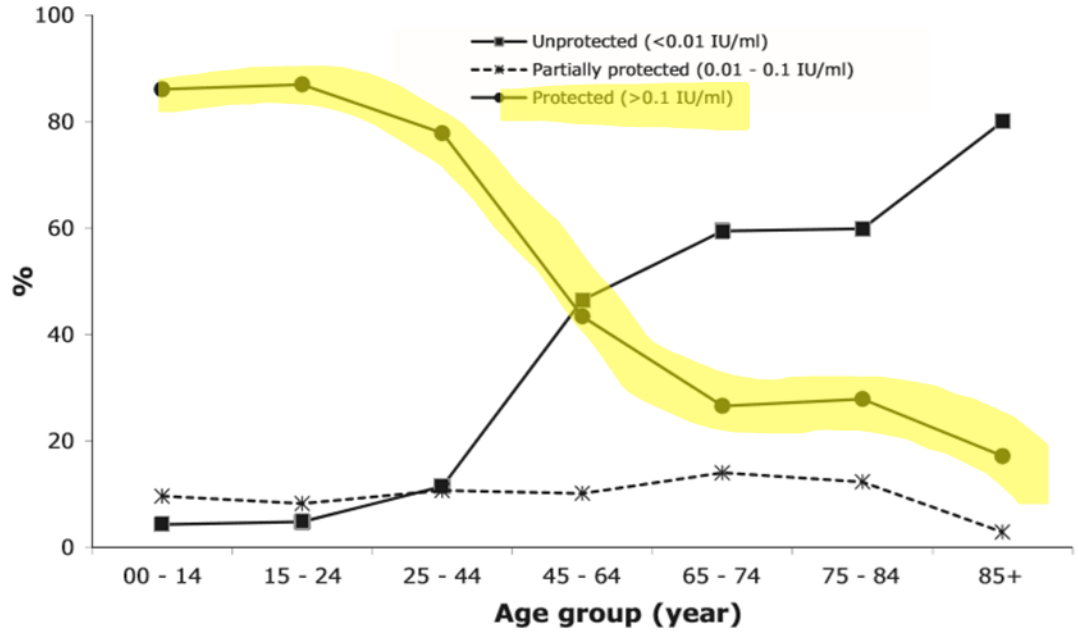


Fig. 3. Percentage of subjects with protective, partially protective and non-protective tetanus antibody levels, by age-group, Italy.

Seroprevalence study

The study population consisted of **3604 individuals**, ranging in age from 0 to 95 years.

- 19.2% (95% CI: 18.0–20.6) was susceptible to tetanus;
- 10.1% (95% CI: 9.1–11.1) had basic, inadequate protection,
- and 70.7% (95% CI: 69.1–72.1) was protected.

The percentage of individuals with protective antibody levels was 78.6%(95% CI: 71.7–84.5) in children ≤1 year of age and increased to a peak of 87.0% (95% CI: 84.1–89.5) in the age group 15–24 years, then progressively declined with increasing age

- 77.8% (95% CI: 74.4–81.0) age group 25–44
- 43.4% (95%CI: 38.6–48.3), 45–64years
- 26.6% (95% CI: 21.4–32.2), 65–74 years,
- 27.9% (95% CI: 22.3–33.9) 75–84 years
- 17.1% (95% CI: 6.6–33.6) ≥85 years

In pronto soccorso?

USA

Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book, 13th Edition (2015)

Tetanus Wound Management

	Clean, minor wounds		All other wounds*	
Vaccination History	Tdap or Td†	TIG	Tdap or Td†	TIG
Unknown or fewer than 3 doses	Yes	No	Yes	Yes
3 or more doses	No§	No	No¶	No

*Such as, but not limited to, wounds contaminated with dirt, feces, soil, and saliva; puncture wounds; avulsions; and wounds resulting from missiles, crushing, burns, and frostbite.

†Tdap is preferred to Td for adults who have never received Tdap. Single antigen tetanus toxoid (TT) is no longer available in the United States.

§Yes, if more than ten years since the last tetanus toxoid-containing vaccine dose.

¶Yes, if more than five years since the last tetanus toxoid-containing vaccine dose.

UK

Immunisation status	Clean wound	Tetanus-prone wound	
	Vaccination with tetanus toxoid	Vaccination with tetanus toxoid	Human tetanus immunoglobulin
Fully immunised	Not required	Not required	Only if high risk (i.e., heavy contamination with material likely to contain tetanus spores and/or extensive devitalised tissue)
Primary immunisation complete, boosters incomplete but up-to-date	Not required, unless second booster due imminently	Not required, unless second booster due imminently	Only if high risk, as above
Primary immunisation incomplete or boosters not up-to-date	Required. Arrange further doses at appropriate intervals to complete immunisation course	Required. Arrange further doses at appropriate intervals to complete immunisation course	1 dose of human tetanus immunoglobulin injected at a different site from the toxoid
Not immunised or uncertain immunisation status	Required. Arrange further doses at appropriate intervals to complete immunisation course	Required. Arrange further doses at appropriate intervals to complete immunisation course	1 dose of human tetanus immunoglobulin injected at a different site from the toxoid

UK recommendations for clean and tetanus-prone wounds Based upon information from Public Health England. Chapter 30: tetanus. In: Immunisation against infectious disease: the green book. London: The Stationary Office, 2013

SCHEMA DI INTERVENTO

MODULARIO SANITÀ 5

MOD. 7 - U G

Roma, 11 novembre 1996

Ministero della Sanità

DIPARTIMENTO PREVENZIONE
Ufficio Profilassi Malattie Infettive

N. 1400.2/19/ 6367

Risposta al Foglio del

N.

CIRCOLARE N. 16

OGGETTO:

TETANO: MISURE DI PROFILASSI

AGLI ASSESSORATI ALLA SANITA' DELLE REGIONI A STATUTO ORDINARIO E A STATUTO SPECIALE
LORO SEDI

AGLI ASSESSORATI ALLA SANITA' DELLE PROVINCE AUTONOME DI TRENTO E BOLZANO
LORO SEDI

AI COMMISSARI DI GOVERNO PRESSO LE REGIONI E LE PROVINCE AUTONOME
LORO SEDI

ALLA PRESIDENZA DEL CONSIGLIO DEI MINISTRI
ROMA

AL MINISTERO DEGLI AFFARI ESTERI
ROMA

AL MINISTERO DELL'INTERNO
ROMA

AL MINISTERO DI GRAZIA E GIUSTIZIA
ROMA

AL MINISTERO DELLE FINANZE
ROMA

AL MINISTERO DEL TESORO, BILANCIO E PROGRAMMAZIONE ECONOMICA
ROMA

AL MINISTERO DELLA DIFESA
ROMA

AL MINISTERO DELLA PUBBLICA ISTRUZIONE DELL'UNIVERSITA' E DELLA RICERCA SCIENTIFICA E TECNOLOGICA
ROMA

AL MINISTERO DEI LAVORI PUBBLICI
ROMA

AL MINISTERO DELLE RISORSE AGRICOLE, ALIMENTARI E FORESTALI
ROMA

AL MINISTERO DELLE POSTE E DELLE TELECOMUNICAZIONI
ROMA

AL MINISTERO DELL'INDUSTRIA, DEL COMMERCIO E DELL' ARTIGIANATO
ROMA

QUALE SCHEMA DI INTERVENTO

Stato vaccinale del soggetto	Ferite minori, pulite		Tutte le altre ferite *	
	VACCINO	IG	VACCINO	IG
Ciclo di base non completato o stato vaccinale incerto	SI	NO	SI	SI
Ultima dose >10 anni	SI	NO	SI	SI
Ultima dose >5 <10 anni	SI	NO	SI	NO
Ultima dose <5 anni	NO	NO	SI se alto rischio	NO

Come da Circolare Ministeriale 11/11/1996

*comprese ferite contaminate con sporcizia, feci, terriccio, saliva, ferite penetranti profonde, exeresi, avulsioni dentarie, ferite da proiettili, schiacciamento, ustioni e congelamento.

Vaccine 26 (2008) 3634–3639

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/vaccine

Appropriate tetanus prophylaxis practices in patients attending Emergency Departments in Italy☆

Rossella Abbate, Gabriella Di Giuseppe, Paolo Marinelli, Italo F. Angelillo*,
The Collaborative Working Group[1]

Department of Public, Clinical and Preventive Medicine, Second University of Naples, Via Luciano Armanni, 5, 80138 Naples, Italy

With regard to the prophylaxis and immunization procedures performed, almost all patients had an accurate toileting and debridement of the wound, tetanus immunoglobulin was prescribed in more than half of those eligible according to the Italian recommendations, whereas the tetanus vaccination has been almost never either recommended or administered. Of the 213 and 502 patients with tetanus-prone wounds or clean wounds, 98.6 and 95.6% were undertreated and 0.5 and 2.6% were overtreated, respectively.

DIFFICOLTÀ

- DEFINIZIONE DI FERITA A RISCHIO
- STORIA VACCINALE/STATO IMMUNITARIO DEL PAZIENTE

DIFFICOLTÀ

L'immunoprofilassi antitetanica, sia attiva che passiva che combinata, rientra tra le buone pratiche cliniche da osservarsi nel trattamento dei traumatizzati anche in occasione degli interventi di Pronto Soccorso. E` indicata per tutti i soggetti che abbiano riportato ferite puntorie, ferite lacere o morsicature di animali, contaminate con terriccio o sporcizia. La profilassi immunitaria antitetanica è indicata anche in caso di ustioni e per qualsiasi lesione accompagnata da segni di mortificazione e necrosi dei tessuti (ulcere trofiche, ulcere varicose, etc...).

Le ferite da taglio "pulite" non necessitano, solitamente, di profilassi antitetanica.

Un'accurata toilette chirurgica ed una adeguata copertura antibiotica si impongono, qualunque sia lo stato vaccinale del soggetto e, di conseguenza, l'immunoprofilassi attuata.

TETANUS-PRONE WOUNDS

Vaccine 32 (2014) 639–644

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journal homepage: www.elsevier.com/locate/vaccine

Tetanus in Italy 2001–2010: A continuing threat in older adults

Antonietta Filia[a,*], Antonino Bella[a], Christina von Hunolstein[b], Antonella Pinto[b], Giovanna Alfarone[c], Silvia Declich[a], Maria Cristina Rota[a]

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[b] National Center for Research and Evaluation of Immunobiologicals, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy
[c] Department of Infectious, Parasitic and Immune-Mediated Diseases, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy

Table 1
Distribution of reported tetanus cases, by type and site of injury and by place of occurrence of injury, Italy 2001–2010.

	No. of tetanus cases	% of total
Type of injury		
Lacerating injury	178	72.7
Puncture wound	47	7.9
Cut/incision	20	3.4
Total	**245**	**100**
Site of injury		
Lower limbs	153	62.2
Upper limbs	79	32.1
Head/trunk	14	5.7
Total	**246**	**100**
Place of occurrence of injury		
Countryside/farm	84	45.2
Garden	50	26.9
Home (indoors)	28	15.0
Road (traffic accident)	13	7.0
Other	11	5.9
Total	**186**	**100**

Source: statutory notification data, National Institute of Health (Istituto Superiore di Sanità – ISS).

Tetanus and Trauma: A Review and Recommendations

Peter Rhee, MD, MPH, Mary K. Nunley, MSN, Demetrios Demetriades, MD, PhD, George Velmahos, MD, PhD, and Jay J. Doucet, MD

J Trauma. 2005;58:1082–1088.

Tetanus-Prone Wounds

The current recommendations for tetanus wound prophylaxis are given in Table 1.[39] The first issue with this recommendation is that wounds should be categorized as either "tetanus-prone" or "non–tetanus-prone." Current guidelines suggest that wounds that are oxygen deficient are tetanus prone, as *C. tenani* is an obligate anaerobe. Thus, wounds that have been crushed, devitalized, or contaminated with dirt or rust are believed to be more prone to tetanus. Wounds such as open fractures, punctures, and abscesses are also thought to be more tetanus prone. Such guidelines would suggest that severe wounds are more tetanus-prone. However, the literature demonstrates that both minor and major wounds alike can cause tetanus. In a Mayo Clinic report of their 25-year experience with tetanus, the cause included a wide variety of wounds that were both minor and major, such as scratches while gardening, stepping on a nail, stepping on a rake, head laceration after a fall, elbow abrasion, Fournier's gangrene, and necrotizing lung mass.[40] In 1987–88, of the 99 cases of tetanus reported in the United States, 41% were caused by farming or gardening activities.[41] Other causes of tetanus reported included body piercing, tattooing, elective hernia surgery, skin ulcers, animal bites, and abscesses. One patient actually got tetanus from an ulcer after biting his own tongue. Minor trauma was responsible for 30% of reported tetanus cases.[40,42] Some cases of tetanus do not even have an identifiable source of acute injury.[23] Given the wide variety of wounds that cause tetanus, wound severity alone does not make a wound tetanus-prone. Reports of tetanus after gunshot wounds or stab wounds in the United States are extremely rare. During a 4-year period (1998–2000), the CDC reported only one case of tetanus from a gunshot wound and one case from an open compound fracture in the United States.[43] In an analysis of Vietnam War wound infections, no cases of tetanus were reported.[44] Therefore, clinical distinction between tetanus-prone wounds and non–tetanus-prone wounds is not feasible.

California reported that 40% of the tetanus cases were caused by injecting drug use (IDU) (mostly heroin) during 1987–97.[45–47] Hispanics constituted 60% of all patients with tetanus reported in California and 89% of IDU-associated

Improving tetanus prophylaxis in the emergency department: a prospective, double-blind cost-effectiveness study

Muriel Stubbe, Luc J M Mortelmans, Didier Desruelles, Rohnny Swinnen, Marc Vranckx, Edmond Brasseur, Philippe E Lheureux

Emerg Med J 2007;**24**:648–653. doi: 10.1136/emj.2007.048520

the following criteria was considered at risk of tetanus: wound care delayed for >6 hours, depth >1 cm, burn, abrasive wound, chronic wound, wound contamination (bite, scratch, stain, foreign bodies, faeces), presence of necrotic tissue, or signs of infection. Presentation of a vaccination card or any

COMPARATIVE STUDY

Role of Rapid Tetanus Antibody Test in Accident and Emergency Department

A. Chithra · K. M. Cariappa · Abhay Taranath Kamath · Adarsh Kudva

Received: 18 February 2014 / Accepted: 13 September 2014

Group 1: Tetanus Prone Wounds

The wounds that met any one of the following criteria were grouped into contaminated or tetanus prone wounds.

Deep punctured wounds with depth of >1 cm, avulsion, open wound for longer than 6 h, contaminated with foreign bodies like soil, glass or flying objects, crushing, burns and frostbite or the irregular margins with signs of devitalization.

VALUTARE LO STATO IMMUNITARIO

- raccolta anamnestica
- test rapidi per la determinazione del titolo anticorpale

TITOLO	PRIMO AUTORE	RIVISTA	ANNO	NAZIONALITà
Detection and titration of tetanus antibodies using an automated passive haemagglutination method	Duvillers-Montreuil	Rev. Fr. Transfus. Immunohematol.	1977	FRA
A Rapid Automated Latex Screen for Tetanus Toxoid Antibodies	J . R. Booth	Vox Sang.	1978	UK
Quantification of tetanus antitoxin in human sera. I. Counter immunoelectrophoresis	Winsnes R.	Acta Pathol. Miocrobiol. Scan. B.	1979	NORVEGIA
Prevention of tetanus in the hospital first-aid service	Covarelli E.	Boll. Ist. Sieroter. Milan.	1980	ITA
Determination of immunity against tetanus infection by passive haemagglutination essay	Marconi p:	Boll. Ist. Sieroter. Milan.	1983	ITA
A new rapid semi-quantitative enzyme immunoassay suitable for determining immunity to tetanus	Chandler H. M.	Journal of InfectionJournal of Infection	1984	AUSTRALIA
Rapid evaluation of tetanus immunity by a haemagglutination test in the injured at a hospital emergency unit	BEYTOUT J.	Riomed. & Pharmacother	1989	FRA
A simplified method of rapid hemagglutination for determining the levels of tetenus antibodies	Reiss J.	Med Dosw. Microbiol.	1991	polonia
Latex agglutination test for detection of tetanus antitoxins	Lee C. L.	Zhonghua Min Guo Wei Sheng Wu Ji Mian Yi Xue Za Zhi	1995	Corea?
Ultramicroelisa for measuring tetanus antitoxin in human sera	Fajardo E.M.	Bull. Pan.AM. Health Organ.	1996	CUBA
Human diseases caused by exotoxin sproduced by anaerobes and their rapid detection	Kato N.	Rinsho Biseibutshu Jinsoku Shindan Kenkyukai Shi	1998	JAP

TEST IMMUNOCROMATOGRAFICO

The characteristics of a test that could be incorporated into this setting should be a short turnaround time and a high availability (rural settings, nights, or weekends), technical simplicity, and ease of interpretation.

However, appropriate training of doctors and nurses would be required, with supervision by a laboratory biologist

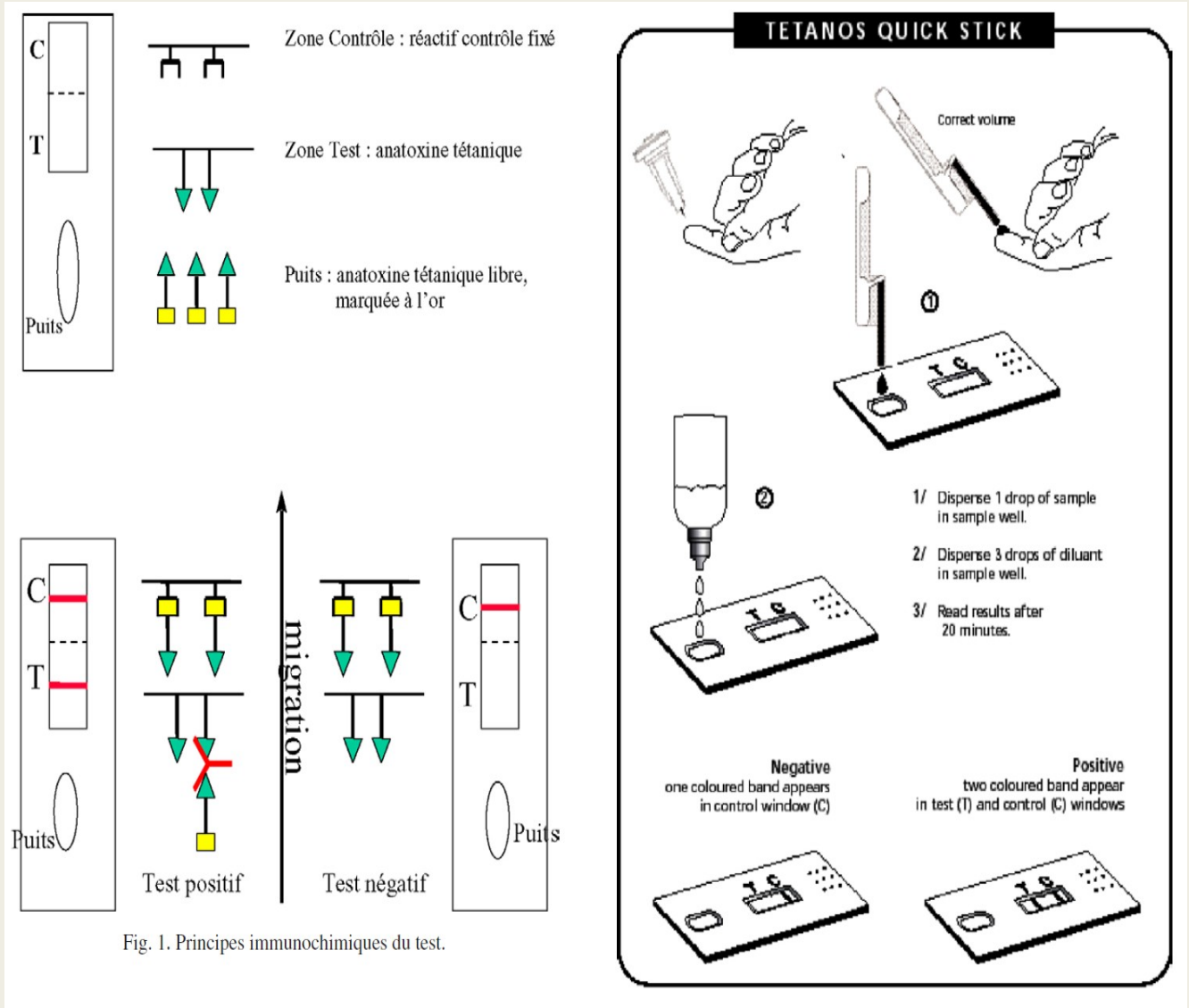


Fig. 1. Principes immunochimiques du test.

TITOLO	PRIMO AUTORE	RIVISTA	ANNO	NAZIONE	SE%	SP%	N°
Diagnosis of Tetanus Immunization Status: multicenter Assessment of a Rapid Biological Test	Colombet I.	Clinical And Diagnostic Laboratory Immunology	2005	FRANCIA	69 (PS) 84 (lab)	98 (PS) 99 (lab)	988
Intégration d'un test rapide dans l'algorithme ministériel actuel pour affiner la prophylaxie antitétanique proposée aux blessés vus dans les services d'urgences	Elkharrat D.	Médecine Et Maladies Infectieuses	2005	FRANCIA	monocentrico 82,2 multicentrico 70	monocentrico 97.3 multicentrico 98	monocentrico 1018 multicentrico 989
Pretravel Consultation: Rapid Dipstick Test as a Decision Guidance for the Application of Tetanus Booster Vaccinations	Paulke-Korinek M.	Journal Of Travel Medicine	2008	AUSTRIA	55	100	97
Tetanus Quick Stick as an applicable and cost-effective test in assessment of immunity status	Hatamabadi H. R.	American Journal Of Emergency Medicine	2011	IRAN	88	97	200
Immunity against tetanus infection, risk factors for non-protection, and validation of a rapid immunotest kit among hospitalized children in Nigeria	Orimadegun A.E.	Frontiers In Neurology	2013	NIGERIA	97.1	96.4	304
Role of Rapid Tetanus Antibody Test in Accident and Emergency Department	Chithra A.	J. Maxillofac. Oral Surg.	2014	INDIA	96.5%	0,87	50
Evaluation of a bedside immunotest to predict individual anti-tetanus seroprotection: a prospective concordance study of 1018 adults in an emergency department	Elkharrat D	Emerg Med J	2015	FRANCIA	83	98	1018
Quick Stick for Identifying Traumatic Patients in Need of Tetanus Prophylaxis; a Diagnostic Accuracy Study	Golikhatir I	Emergency	2017	IRAN	96,38	100	148

TITOLO	PRIMO AUTORE	RIVISTA	ANNO	NAZIONALITà	N°
Improving tetanus prophylaxis in the emergency department: a prospective, double-blind cost-effectiveness study	Stubbe M.	Emerg Med J	2007	BELGIO	498
Quality proceedings in point-of-care testing: tetanus test example.	Descamps Pouchelle IM	Ann. Biol. Clin.	2010	FRANCIA	///
Effectiveness and cost of quick diagnostic tests to determine tetanus immunity in patients with awound in french emergency departments	N'Diaye D. S.	BMC Infectious Diseases	2014	FRA	1'658'000
Prevalence and socio-demographic factors associated with non-protective immunity against tetanus among high school adolescents girls in Nigeria	Orimadegun A.E.	Italian Journal of Pediatrics	2014	NIGERIA	851
Are current UK tetanus prophylaxis procedures for wound management optimal?	Cooke M.W.	Emerg Med J	2015	UK	///
Assessment of tetanus immunity status by tetanus quick stick and anamnesis: a prospective double blind study	Orsi G.B.	Ann Ig	2015	ITA	400
Non-protective immunity against tetanus in primiparouswomen and newborns at birth in rural andurban settings inIbadan, Nigeria	Orimadegun A.E.	The Pan African Medical Journal	2017	NIGERIA	244
Performance of a bedside test for tetanus immunity:results of a cross-sectional study among three Eds in the Netherlands in 2012 2013	Van Der Maas NAT	Emerg Med J	2017	OLANDA	601

Diagnosis of Tetanus Immunization Status: Multicenter Assessment of a Rapid Biological Test

Isabelle Colombet,[1]* Colette Saguez,[3] Marie-José Sanson-Le Pors,[4] Benoît Coudert,[5] Gilles Chatellier,[1] Pierre Espinoza,[2] and the Scientific Committee of the TetaQuick 1000 Study

Université Paris-Descartes, Faculté de Médecine, INSERM U729, AP-HP, Hôpital Européen Georges Pompidou, Department of Hospital Informatics, Evaluation and Public Health, 20 rue Leblanc, 75015 Paris, France[1]; Emergency Network Department (Medicine and Traumatology), AP-HP, Hôpital Européen Georges Pompidou, 20 rue Leblanc, 75015 Paris, France[2]; SPIM, Paris 6 University, Paris, France[3]; AP-HP, Hôpital Lariboisière, 75010 Paris, France[4]; and Centre Hospitalier de Versailles, 78000 Versailles, France[5]

Received 7 April 2005/Returned for modification 17 May 2005/Accepted 10 June 2005

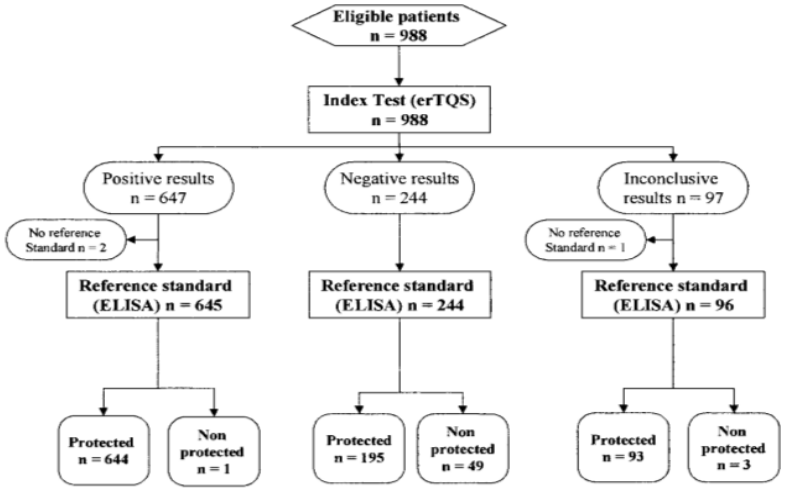


FIG. 1. Flowchart of the study.

- Fattibilità: tramite schede di valutazione della semplicità di effettuazione, di interpretazione e tempo richiesto

- Analisi del test con vs ELISA
  - Siero/plasma/sangue
  - Operatore del PS / Operatore di laboratorio

- Come il test avrebbe modificato la prescrizione medica di Ig o Vaccino in base alle attuali linee guida francesi

TABLE 3. Diagnostic accuracy of vaccination history and TQS test in the emergency department and in the laboratory, with ELISA as reference

Test	Pro-tected[a]	Not pro-tected[a]	Likelihood ratio (95% CI)
Structured clinical history			
Complete and certain vaccination	575	11	2.99 (1.77–5.09)
Incomplete vaccination	88	9	0.56 (0.30–1.05)
Dubious or no vaccination	250	31	0.46 (0.36–0.59)
Unknown vaccination history	11	2	0.31 (0.07–1.39)
Total	924	53	977
TQS in the emergency department[b]			
Positive	644	1	36.62 (5.25–255.3)
Inconclusive	93	3	1.76 (0.58–5.38)
Negative	195	49	0.22 (0.20–0.26)
Total	932	53	984
Total blood/lab-TQS at laboratory[b]			
Positive	779	0[c]	89.08 (5.64–1405)
Inconclusive	36	0[c]	4.12 (0.26–67.0)
Negative	112	52	0.12 (0.10–0.15)
Total	927	52	979
Serum/lab-TQS at laboratory[b]			
Positive	800	0[c]	92.70 (5.87–1462)
Inconclusive	30	0[c]	3.48 (0.219–57.0)
Negative	102	53	0.11 (0.09–0.13)
Total	932	53	985

[a] Protected is defined as >0.1 IU/ml in ELISA; not protected is defined as ≤0.1 IU/ml in ELISA.
[b] Serum/lab-TQS at laboratory is considered positive beyond a threshold of 0.1 IU/ml; total blood/lab-TQS in the laboratory and in emergency department are considered positive beyond a threshold of 0.2 IU/ml.
[c] Likelihood ratios were calculated by taking the 0 value as 0.5.

RISULTATI

- A 120 pazienti (13.1) che risultavano protetti in base al titolo anticorpale erano state inutilmente somministrate immunoglobuline. Il TQS avrebbe individuate 23 di questi pazienti come protetti
- 8 pazienti non protetti non sono stati trattati. Se TQS fosse stasto usato nell’algoritmo decisionale questo errore sarebbe stato evitato (tutti e 8 risultavano negative al test)

Ann Ig 2015; 27: 467-474 doi:10.7416/ai.2015.2033

Assessment of tetanus immunity status by tetanus quick stick and anamnesis: a prospective double blind study

G.B. Orsi*, C. Modini**, M.A. Principe**, M. Di Muzio*, A. Moriconi***, M.G. Amato***, S.M. Calderale**

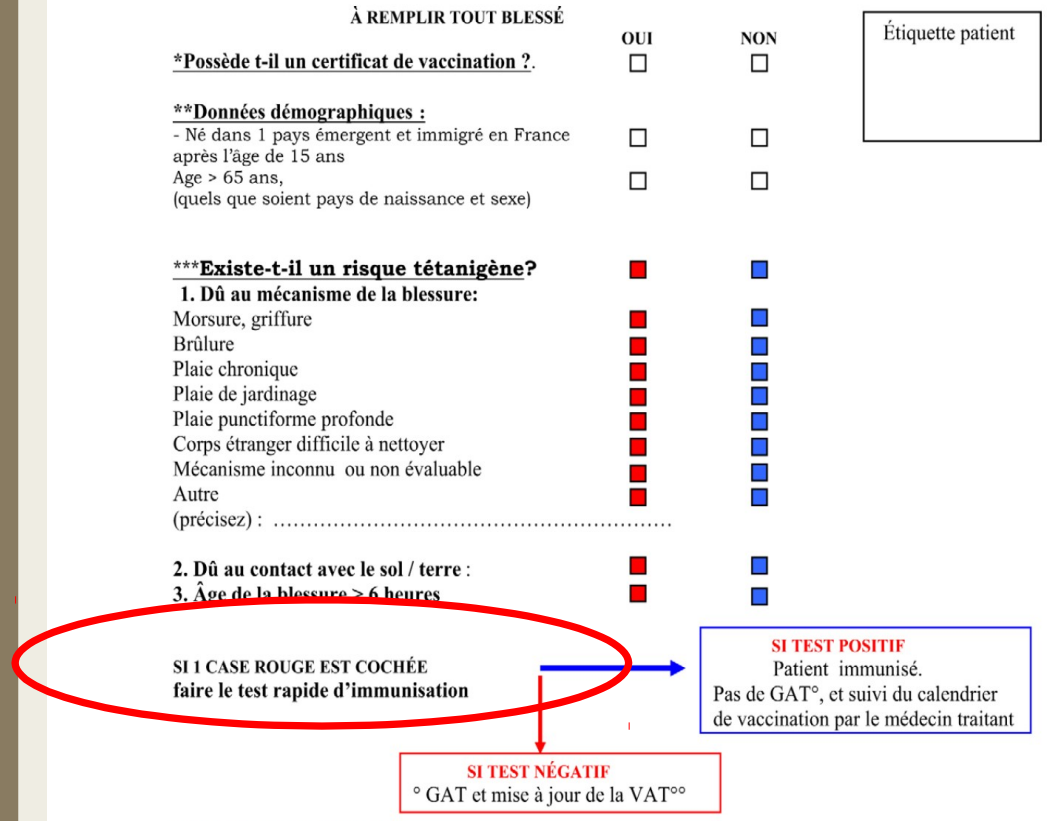
Background: *In patients with wounds admitted to Emergency Departments (ED) acquiring tetanus vaccination history by interview is very unreliable. Protected patients may receive unnecessary prophylaxis and unprotected nothing. Aim of the study was to evaluate tetanus immunity status comparing the traditional anamnestic method with the Tetanus Quick Stick (TQS), a rapid immunochromatographic test.*

Methods: *A double-blind prospective study was carried out in the ED of the 1,000 bed teaching hospital Umberto I in Rome. Adult patients (≥18) with wounds attending at the ED were randomly included. Tetanus immunity status was evaluated by healthcare workers (HCWs) comparing the TQS test with the anamnesis. TQS test was performed by a trained HCW and afterwards the anamnesis about tetanus immunity status was collected by another HCW unaware of the TQS result. Also cost analysis was carried out.*

Results: *Overall 400 patients (242 males and 158 females) were included, mean age was 46.7 ± 20.2 years (median 44 range 18 – 109), 304 (76.0%) were italians and 96 foreigners (24.0%). Overall, 209 (52.2%) resulted TQS +, and protective immunity level was associated to lower mean age (40.1 ± 16.8 vs 53.8 ± 21,1; p<0,01). Using the anamnestic method 336 (84.0%) patients resulted "unprotected", 52 (13.0%) "partially unprotected" and 12 (3.0%) "completely protected". TQS test results showed that 154 (45.8%) out of 336 "unprotected" and 45 (86.5%) out of 52 "partially unprotected" actually had a protective antibody level. Finally two (16.7%) out of 12 "completely protected" group presented a non protective antibody level. Following only the anamnestic method 201 (50.0%) patients would have received some inappropriate treatment. Adopting TQS test in all patients would also be cost-effective saving € 1.95/patient. As tetanus immunity is inversely related to age, for <51 years old patients unnecessary treatment would have been avoided in 57.1% of patients, with a mean reduction per patient of € 7.50/patient with the TQS vs. € 12.69/ patient without.*

Conclusion: *The study showed that tetanus protective immunity prevalence among adult patients attending our ED is about 50% and is mainly influenced by class age. TQS use allowed to reduce drastically inappropriate tetanus vaccine and immunoglobulins booster treatment. Also TQS use reduced costs.*

Annexe 1. Algorithme intégrant les données d'un test rapide prédictif de la protection des individus contre le tétanos pour affiner la prophylaxie antitétanique proposée aux blessés vus aux urgences



À REMPLIR TOUT BLESSÉ

Étiquette patient

	OUI	NON
***Possède t-il un certificat de vaccination ?**.	☐	☐
****Données démographiques :**		
- Né dans 1 pays émergent et immigré en France après l'âge de 15 ans	☐	☐
Age > 65 ans, (quels que soient pays de naissance et sexe)	☐	☐
*****Existe-t-il un risque tétanigène?**	☐	☐
1. Dû au mécanisme de la blessure:		
Morsure, griffure	☐	☐
Brûlure	☐	☐
Plaie chronique	☐	☐
Plaie de jardinage	☐	☐
Plaie punctiforme profonde	☐	☐
Corps étranger difficile à nettoyer	☐	☐
Mécanisme inconnu ou non évaluable	☐	☐
Autre (précisez) :	☐	☐
2. Dû au contact avec le sol / terre :	☐	☐
3. Âge de la blessure > 6 heures	☐	☐

SI 1 CASE ROUGE EST COCHÉE
faire le test rapide d'immunisation

SI TEST POSITIF
Patient immunisé.
Pas de GAT°, et suivi du calendrier de vaccination par le médecin traitant

SI TEST NÉGATIF
° GAT et mise à jour de la VAT°°

Modalités d'administration:

- °GAT: Gammaglobulines antitétaniques: 250 UI par voie intramusculaire. Produit soumis à la traçabilité et accompagné d'une information sur les dérivés du sang.
- °°VAT: vaccination antitétanique = 1 dose par voie SC ou IM

* Si oui et vaccination à jour, pas de PAT (prophylaxie antitétanique), si non continuer.
** Si oui à l'une des 2 questions et pas de certificat de vaccination, considérer comme non protégé.
***Classification des ruptures du revêtement cutanéo-muqueux (**Réf. 4,6**).
a) Les blessures propres, linéaires, survenant dans un contexte domestique, sans contact avec la terre sont dénués de risque tétanigène.
b) Toutes les autres, incluent (mais ne sont pas limitées à) les blessures contaminées par les fèces, la terre, la salive; toutes les piqûres profondes peu accessibles au nettoyage; les avulsions; toutes les blessures par armes à feu, les écrasements, les brûlures ou les gelures. Le risque tétanigène y est considéré vraisemblable, la distinction en risque modéré et élevé étant artificielle.

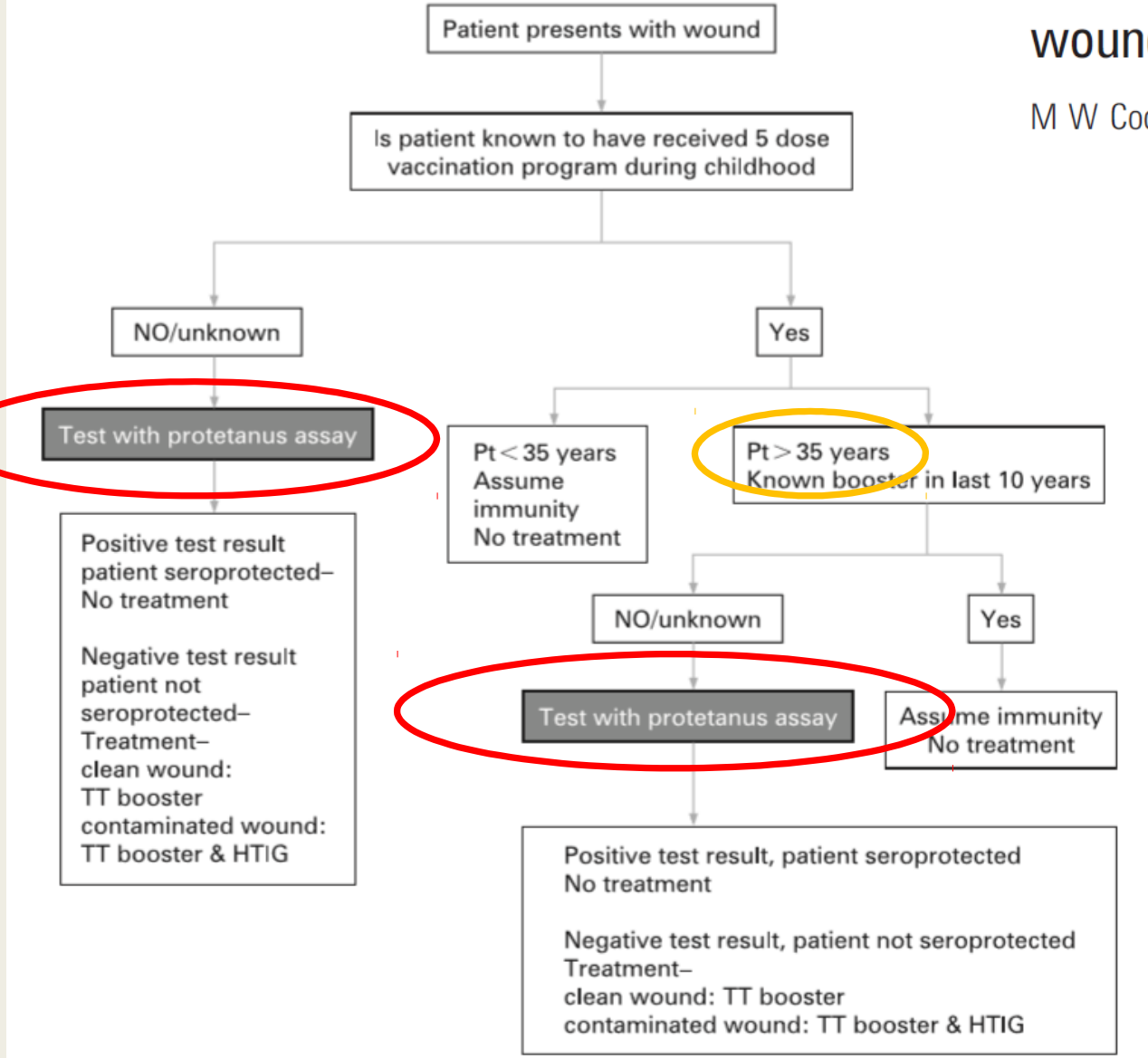
Recommandations

Intégration d'un test rapide dans l'algorithme ministériel actuel pour affiner la prophylaxie antitétanique proposée aux blessés vus dans les services d'urgences

D. Elkharrat (Coordinateur Chef de service SAU) [a,*], P. Espinoza [b], J. De la Coussaye [c], G. Potel (Chef de service des urgences) [d], J.-L. Pourriat (Chef de service SAU) [e], M.-J. Sanson-Le Pors (Chef du service de bactériologie–virologie) [f]

Are current UK tetanus prophylaxis procedures for wound management optimal?

M W Cooke



Improving tetanus prophylaxis in the emergency department: a prospective, double-blind cost-effectiveness study

Muriel Stubbe, Luc J M Mortelmans, Didier Desruelles, Rohnny Swinnen, Marc Vranckx, Edmond Brasseur, Philippe E Lheureux

Emerg Med J 2007;**24**:648–653. doi: 10.1136/emj.2007.048520

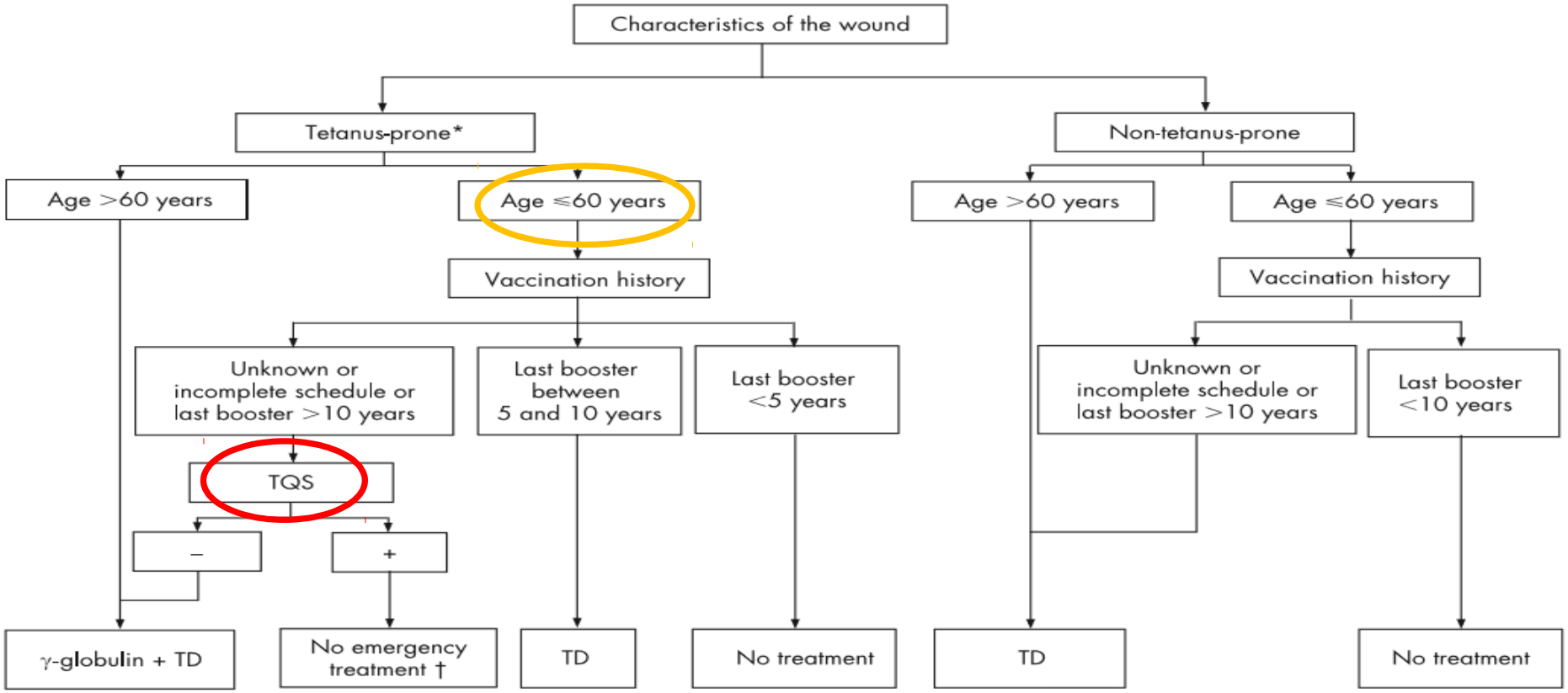


Figure 3 Proposed algorithm for management of patients presenting with wound in the ED. *Wounds with a risk of anaerobiosis such as, but not limited to, wounds contaminated with dirt, faeces, soil or saliva; puncture wounds; treatment delayed (>6 hours); avulsions; wounds resulting from burns or crushing; chronic wounds; wounds with signs of necrosis or infection. †Refer the patient to his general practitioner to check immunity and the need for Td booster.

CONCLUSIONE: «UN PROTOCOLLO TUTTO NOSTRO»

GRAZIE

Caterina Passalia, Dirigente Medico POU ASL3 Genovese
Paolo Bernuzzi, CFSMG Regione Liguria

W.H.O. TETANUS VACCINE POSITION PAPER, FEBBRAIO 2017

DTP	DTP	DTP	DTP	DTP/Td and tetanus	DTP/Td and tetanus
Before age one or as early as possible after age 6 weeks, with >=4 weeks intervals, better within 6 months.			12-23 months	4-7years	9-15 years

Immunizations with diphtheria–tetanus–pertussis (DTP) and diphtheria toxoid (Td) vaccines required to obtain long-term protection against tetanus. This schedule will induce immunity well through adulthood – a duration of 20–30 years.

Protocollo vaccinale consigliato dall'Organizzazione Mondiale della Sanità

IL CALENDARIO VACCINALE ASL3

CALENDARIO VACCINAZIONI dalla NASCITA all' ADOLESCENZA- REGIONE LIGURIA(PRPV 2014)				
difterite tetano pertosse	difterite tetano pertosse	difterite tetano pertosse	difterite tetano pertosse	difterite tetano pertosse
3° mese Dal 61° giorno	5°mese 121° giorno	12°mese	5-6 anni	11-17anni

L'ASL3 raccomanda di proseguire i richiami di questa vaccinazione insieme a quella antidifterica e antipertossica oltre che nell'età infantile anche negli adolescenti e negli adulti, ogni dieci anni, in modo da mantenere una buona difesa .

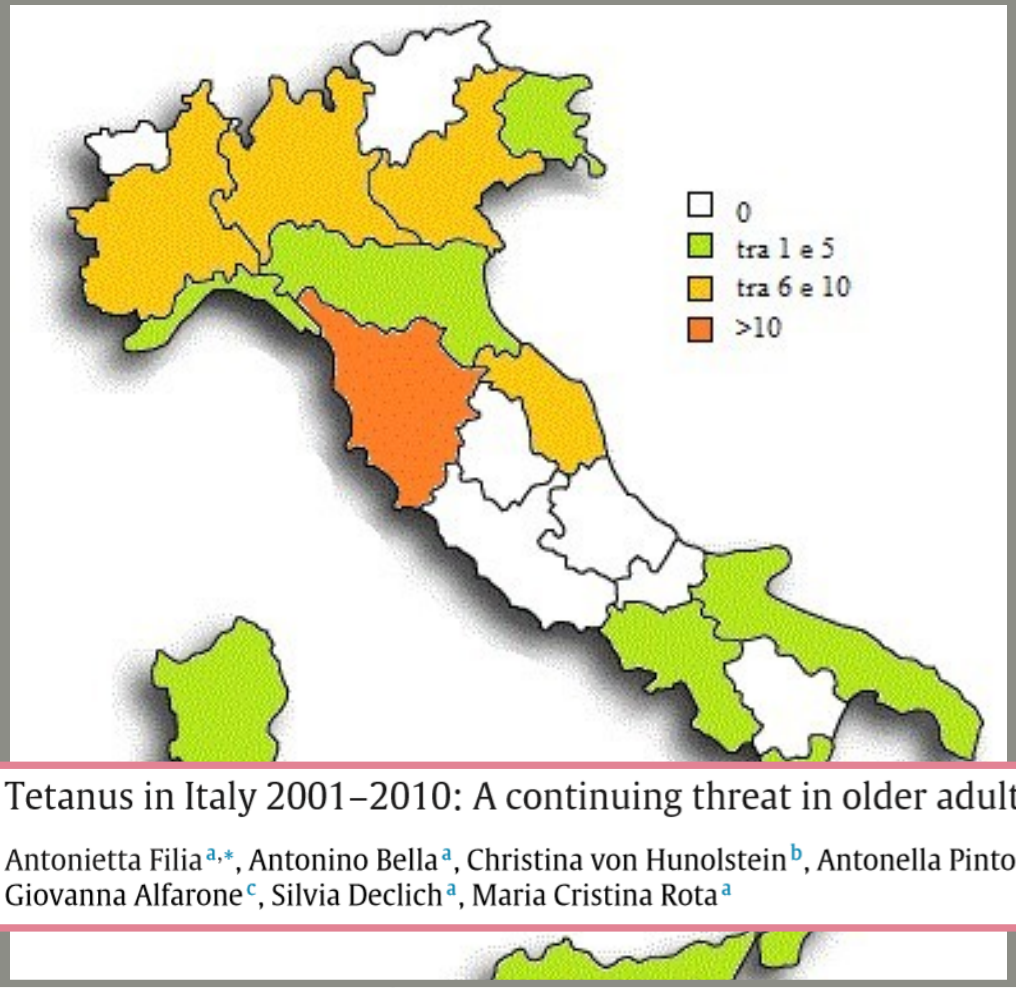
World Health Organization

Organisation mondiale de la Santé

Tetanus vaccines: WHO position paper – February 2017

- Immunity declines with time.
- One year after vaccination, the percentage of poorly-protected persons may increase to 20% and the mean titre may fall to the protective threshold.
- A third dose induces protective immunity in almost 100% of those vaccinated. In children, a 3-dose primary series of DTP induces an antibody titre above the minimum protective threshold, with a mean level above 0.2 IU/ml as reported in several studies

Casi di tetano notificati in Italia nel 2002, suddivisi per regione

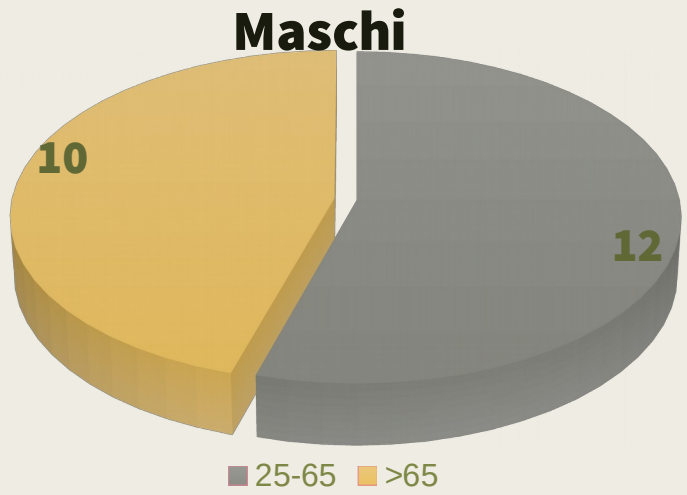


Tetanus in Italy 2001–2010: A continuing threat in older adults

Antonietta Filia[a,*], Antonino Bella[a], Christina von Hunolstein[b], Antonella Pinto[b], Giovanna Alfarone[c], Silvia Declich[a], Maria Cristina Rota[a]

Differences in antibody levels were also observed by geographical area. Overall, the percentage of immune subjects was 75.1% in northern Italy, 68.1% in central Italy and 67.0% in southern Italy ($p = 0.000$). Wider differences between geographical areas were

Età	≥25 <65	≥65	Totale
Donne	4	42	46+1 (1 dato mancante)
Uomini	12	10	22
Totale	16	52	68+1



Valutazione di un test rapido (TQS) per la determinazione dello stato immunitario antitetanico in pazienti con ferite in Pronto Soccorso. Studio pilota

C. Prevaldi, G. Ragusa, A. Fede Catania, D. Luccisano, G. Buffolo, E. Ferro, M. Valeri, F. Domenichini, M. Bettinardi, K. Zanchetto, D. Vido

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Risultati

Dei 50 pazienti valutati a rischio secondo l'intervista, 22 sono risultati positivi al test TQS e quindi già immunizzati contro il tetano, mentre 28 risultavano negativi. Di questi, 3 pazienti che asserivano di essersi recentemente sottoposti a richiamo vaccinale, risultavano negativi al test TQS, e quindi non immunizzati rispetto al tetano.

Conclusioni

Da questa esperienza pilota, emerge che il TQS:

- ha modificato la gestione nel 42% dei casi, evitando trattamenti non necessari in 22 casi su 49, con un reale beneficio per i pazienti e un interessante risparmio economico;
- ha permesso di individuare e trattare 3 pazienti che sarebbero rimasti sottoimmunizzati e a rischio di infezione;

European Centre for Disease Prevention and Control. Annual Epidemiological Report–Tetanus. 2017

Country	2011		2012		2013		2014		2015				
	Reported cases		Reported cases		Reported cases		Reported cases		National coverage	Reported cases			Confirmed cases
	Number	Rate	Number	Rate	Number	Rate	Number	Rate		Number	Rate	ASR	
Austria	0	0.00	.	.	.	.	.	.	.	.	.	.	.
Belgium	0	0.00	0	0.00	.	.	.	.	.	.	.	.	.
Bulgaria	4	0.05	2	0.03	1	0.01	0	0.00	Y	0	0.00	0.00	0
Croatia	.	.	1	0.02	0	0.00	1	0.02	Y	3	0.07	0.06	0
Cyprus	0	0.00	0	0.00	0	0.00	0	0.00	Y	0	0.00	0.00	0
Czech Republic	0	0.00	0	0.00	0	0.00	0	0.00	Y	1	0.01	0.01	1
Denmark	0	0.00	0	0.00	1	0.02	0	0.00	Y	0	0.00	0.00	0
Estonia	2	0.15	0	0.00	1	0.08	0	0.00	Y	0	0.00	0.00	0
Finland	.	.	.	.	.	.	.	.	.	.	.	.	.
France	9	0.01	5	0.01	10	0.02	4	0.01	Y	12	0.02	0.02	12
Germany	.	.	.	.	.	.	.	.	.	.	.	.	.
Greece	11	0.10	7	0.06	5	0.05	2	0.02	Y	6	0.06	0.04	0
Hungary	4	0.04	5	0.05	2	0.02	2	0.02	Y	3	0.03	0.03	0
Ireland	0	0.00	1	0.02	1	0.02	1	0.02	Y	1	0.02	0.02	1
Italy	58	0.10	54	0.09	71	0.12	49	0.08	Y	48	0.08	0.06	42
Latvia	0	0.00	0	0.00	0	0.00	0	0.00	Y	0	0.00	0.00	0
Lithuania	2	0.07	2	0.07	2	0.07	1	0.03	Y	2	0.07	0.07	0
Luxembourg	0				0	0.00	0	0.00	Y	0	0.00	0.00	0
Malta	0				0	0.00	0	0.00	Y	0	0.00	0.00	0
Netherlands	6				1	0.01					0.01	0.01	0
Poland	14				4	0.04					0.03	0.03	0
Portugal	0				1	0.01					0.01	0.01	0
Romania	20				6	0.03					0.04	0.04	6
Slovakia	1				0	0.00					0.00	0.00	0
Slovenia	2				1	0.05					0.15	0.14	1
Spain	10				9	0.02	4	0.01	Y	9	0.02	0.02	2
Sweden	3				3	0.03	2	0.02	Y	0	0.00	0.00	0
United Kingdom	3	0.00	6	0.01	7	0.01	7	0.01	Y	6	0.01	0.01	0
EU	**149**	**0.04**	**123**	**0.03**	**136**	**0.03**	**97**	**0.02**	.	**115**	**0.03**	**0.03**	**65**
Iceland	0	0.00	0	0.00	0	0.00	0	0.00	Y	0	0.00	0.00	0
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.	.	.
Norway	0	0.00	1	0.02	0	0.00	1	0.02	Y	2	0.04	0.04	2
EU/EEA	**149**	**0.04**	**124**	**0.03**	**136**	**0.03**	**98**	**0.02**	.	**117**	**0.03**	**0.03**	**67**

Source: Country reports. Legend: Y = yes, N = no, C = case based, · = no report, ASR: age-standardised rate

Nel 2011 i casi notificati in Italia rappresentavano il 38,9% del totale europeo.

Nel 2015 i casi notificati rappresentavano il 41,02% del totale

Are current UK tetanus prophylaxis procedures for wound management optimal?

M W Cooke

protection was lower in older people (31% to 60% in individuals > 60 years[20–24] in the USA, UK and Belgium), in women (64% to 86% in the US studies[20 21]) and in immigrants (52% to 75% in the US studies[20 21] and 45% to 52% in the Belgian study[23]).

Tetanus and Trauma: A Review and Recommendations

Peter Rhee, MD, MPH, Mary K. Nunley, MSN, Demetrios Demetriades, MD, PhD, George Velmahos, MD, PhD, and Jay J. Doucet, MD

J Trauma. 2005;58:1082–1088.

- Il primo problema con questa raccomandazione è che le ferite dovrebbero essere classificate come "tetaniche" o "non tetaniche".
  - *ferite carenti di ossigeno sono inclini al tetano. Pertanto, le ferite che sono state schiacciate, devitalizzate o contaminate da sporcizia o ruggine sono ritenute più inclini al tetano.*
  - *Anche le ferite come fratture aperte e ascessi sono più inclini al tetano.*
- Tuttavia, la letteratura dimostra che sia le ferite minori che quelle maggiori possono provocare il tetano. In una relazione della Mayo Clinic sulla loro esperienza venticinquennale con il tetano, la causa includeva un'ampia varietà di ferite minori e maggiori:
  - *la testa lacerazione dopo caduta, abrasione del gomito, gangrena di Fournier e massa polmonare necrotizzante.*
- Nel 1987-88, dei 99 casi di tetano riportati negli Stati Uniti,
  - *il 41% era causato da attività agricole o di giardinaggio*
  - *Altre cause di tetano riportate incluso piercing, tatuaggi, chirurgia elettiva dell'ernia, Minori traumi sono stati responsabili del 30% dei casi di tetano riportati e alcuni casi di tetano non hanno nemmeno una fonte identificabile di danno acuto*
- Rapporti di tetano dopo ferite da arma da fuoco o coltellate negli Stati Uniti sono estremamente rari. Durante un periodo di 4 anni (1998-2000), il CDC ha riportato solo un caso di tetano da una ferita da arma da fuoco e un caso da una frattura composta negli Stati Uniti.
- La California ha riportato che il 40% dei casi di tetano è stato causato dall'uso di droghe per via parenterale (IDU) (per lo più eroina) durante gli anni 1987-97.

In longitudinal studies involving 7 [6] or 45 [7] subjects, tetanus-specific antibodies declined with a half-life of 11 years (95% confidence interval [CI], 10–16) [7].

the United States [8] and Canada [9], continue to recommend booster vaccination every 10 years, the United Kingdom recommends no adult booster vaccinations after the initial 5-dose childhood immunization series [10].

Moderate agreement was observed between the blood/emergency-TQS and blood/lab-TQS results, probably due to the proportion of inconclusive tests, which was higher for TQS tests performed in the emergency department (9.8%) than for those performed in the laboratory (3.9%). Moreover, in a few cases, the emergency department operator reported the TQS test to be positive, despite being unsure or not seeing a pink strip in the test zone. Laboratory operators gave no such incoherent interpretations. This finding identifies several technical characteristics of the test, which may limit its feasibility in the emergency department:

(i) the use of the disposable pipette may have resulted in false-negative results due to the presence of insufficient blood in the device;

(ii) difficulties reading the control line were also reported by a few emergency department operators, representing 23 tests;

(iii) compliance with the 20-minute interval until reading was less stringent in the emergency department than in the laboratory; and

(iv) 76% of tests were performed by emergency department physicians, whereas routine tests in these departments (i.e., urinary or glucose tests) are performed by nurses well trained for these tasks.

- Immunoglobulin was unnecessarily given to 120 (13.1%) protected patients. If the blood/emergency-TQS had been used for decision making, this prescription could have been avoided in 23 patients for whom positive results were obtained in this test. Eight unprotected patients (15%) received no treatment.

- If TQS had been used for decision making, this error would have been avoided in all these patients (all tested negative in blood/emergencyTQS).