

# Le infezioni nel paziente

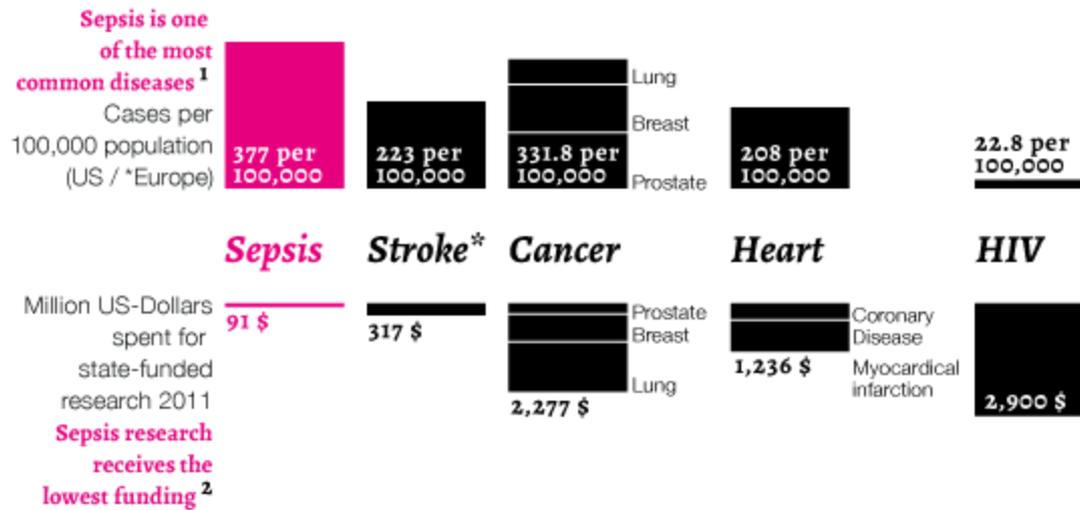


in Terapia Intensiva



**Giornate Mediche di  
Santa Maria Nuova  
2012**

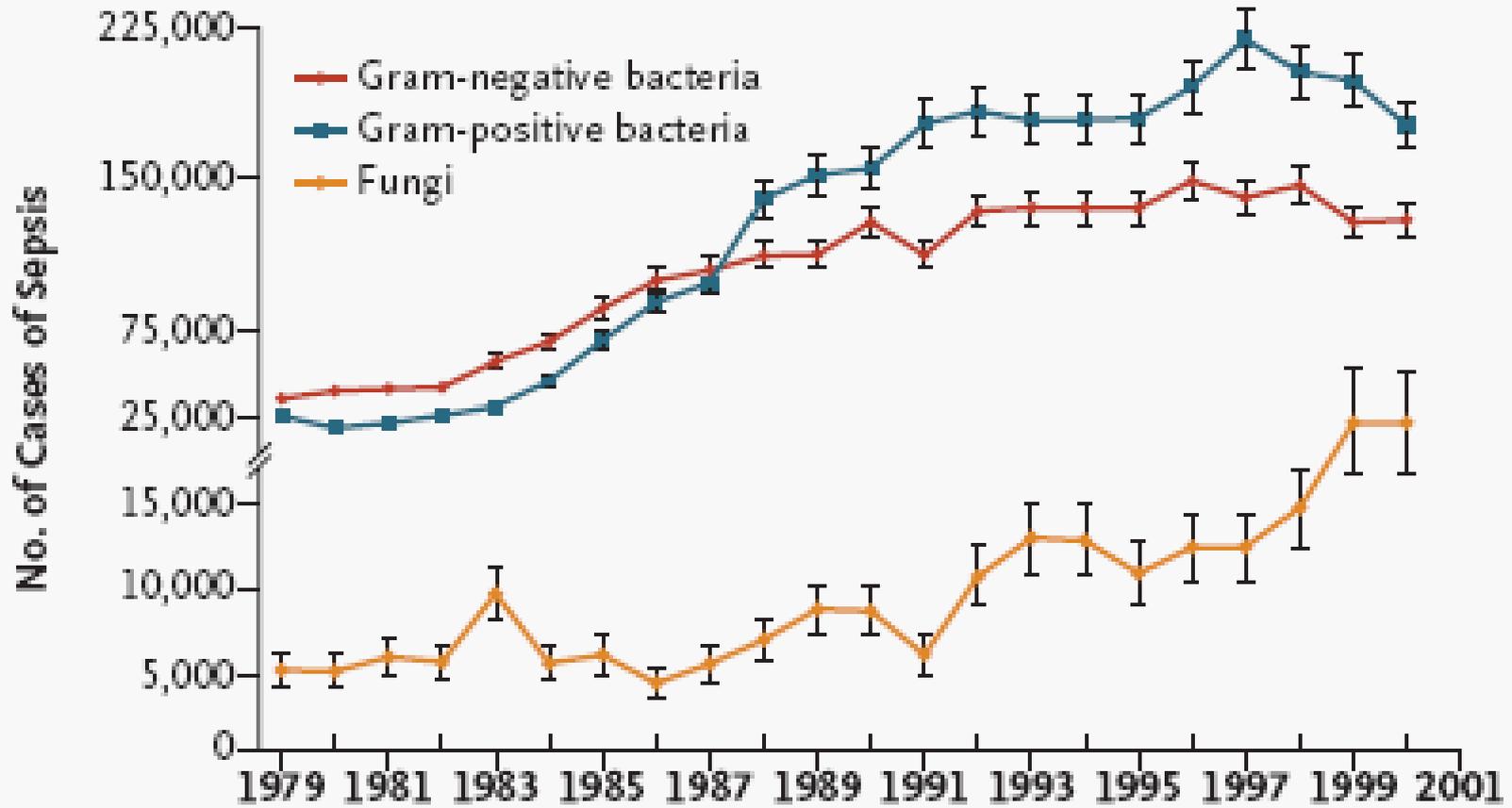
M.Barattini  
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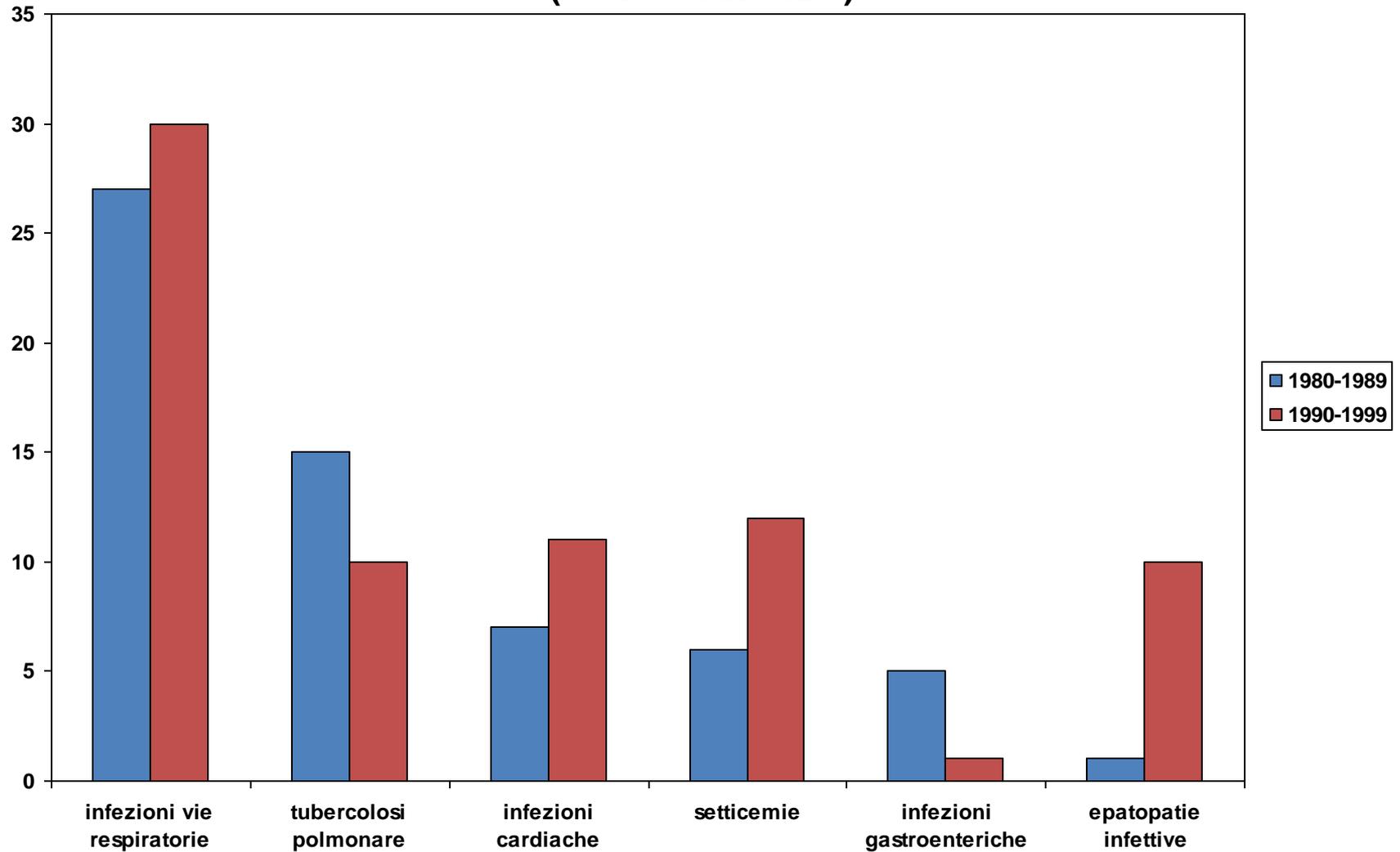
# The Epidemiology of Sepsis in the United States

Number of cases of sepsis in the United States, according to the causative





## Distribuzione mortalità per malattie infettive più frequenti in Italia (escluso HIV/AIDS)





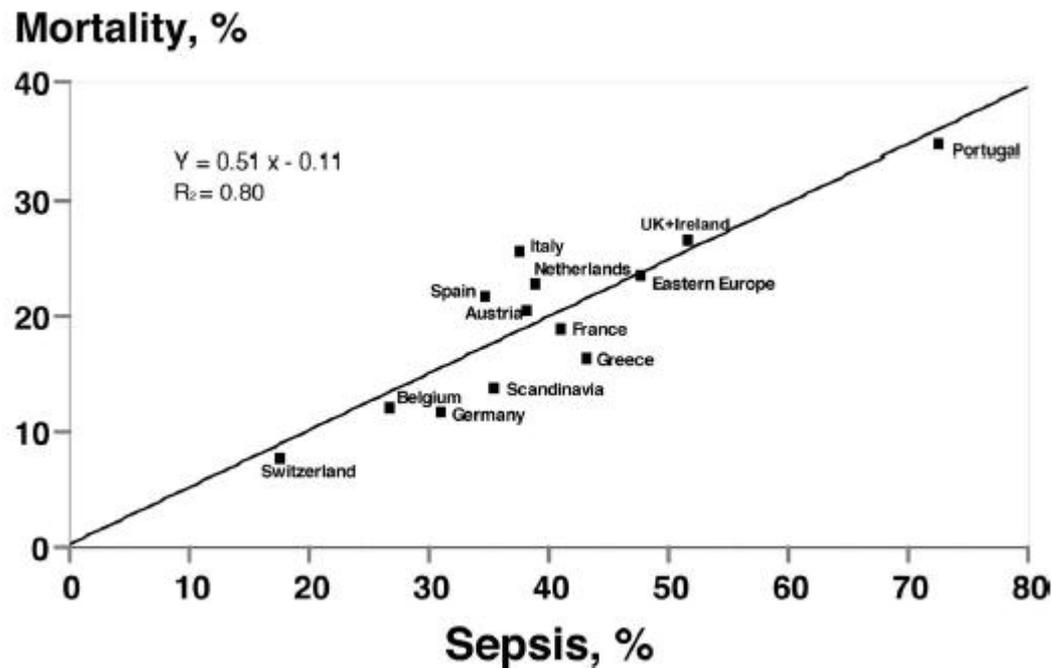
# Sepsis in European intensive care units: Results of the SOAP study\*

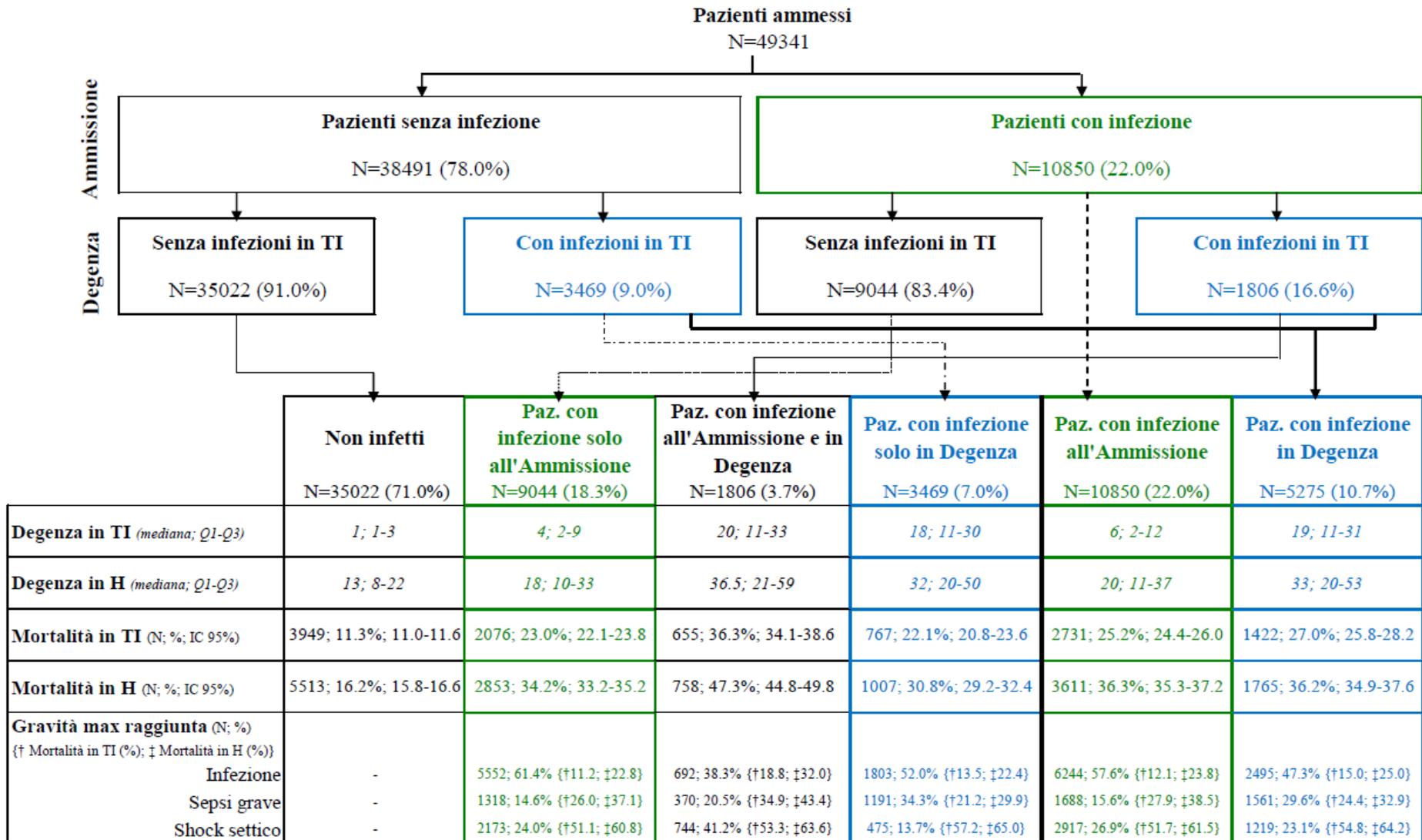
Characteristics of Sepsis Patients (n = 1177)

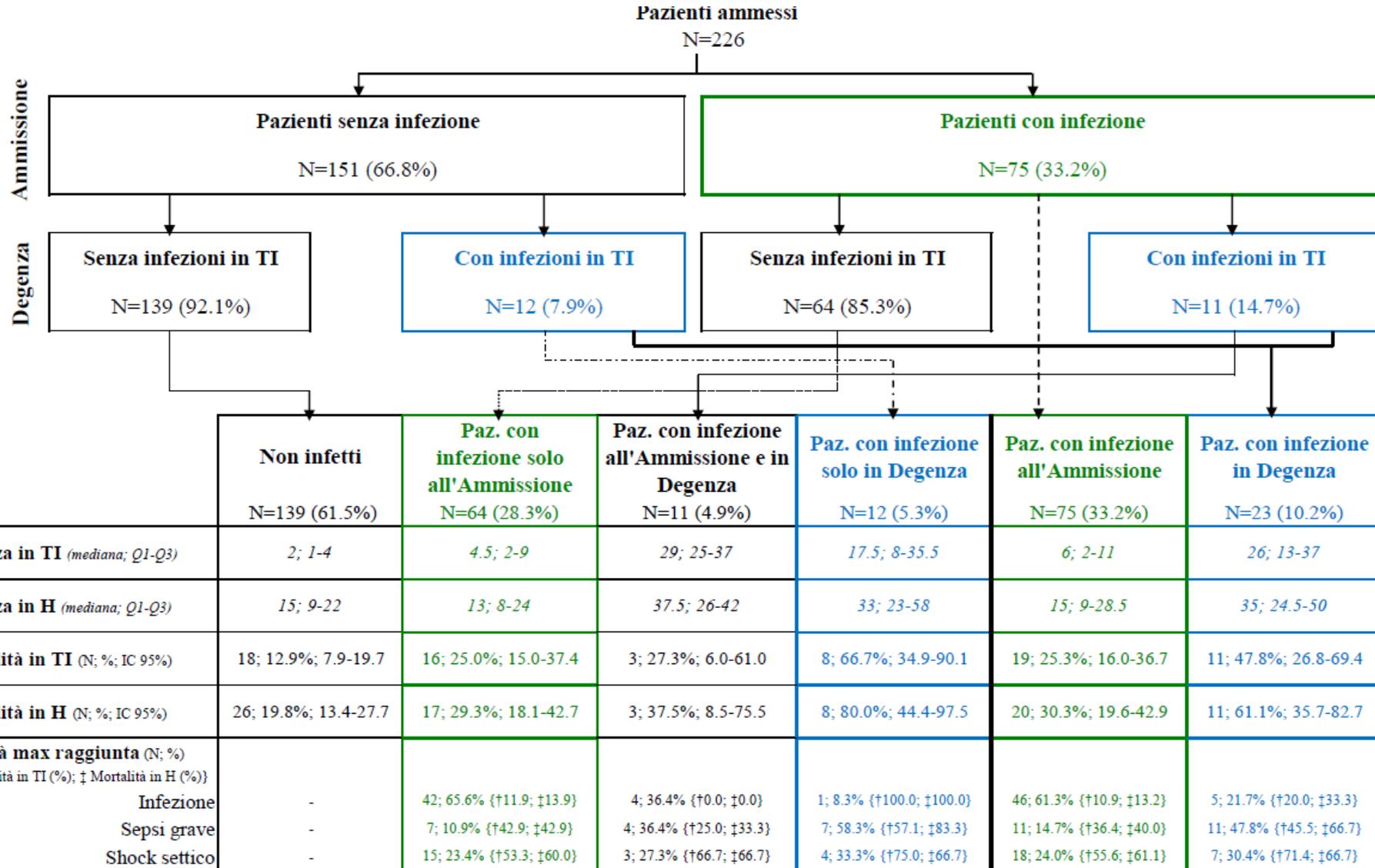
Country	No. of Centers	No. of Patients (%)	ICU Mortality, n (%) <sup>a</sup>	Hospital Mortality, n (%) <sup>a</sup>	Frequency, n (%)	SAPS II Score, Mean ± SD	ICU Mortality, n (%) <sup>a</sup>	Hospital Mortality, n (%) <sup>a</sup>	Severe Sepsis, n (%)
Austria	8	68 (2)	14 (21)	16 (24) <sup>b</sup>	26 (38)	42.5 ± 17.2	6 (23)	8 (31)	18 (27)
Belgium	19	703 (22)	86 (12)	120 (17)	188 (27)	38.7 ± 15.0	39 (21)	57 (31) <sup>c</sup>	125 (18)
Eastern Europe <sup>d</sup>	15	174 (6)	41 (24)	53 (31) <sup>b</sup>	83 (48)	40.2 ± 15.0	24 (29)	31 (37)	74 (43)
France	21	332 (11)	63 (19)	70 (21)	136 (41)	43.4 ± 18.0	37 (27)	44 (32)	99 (30)
Germany	21	329 (11)	39 (12)	51 (16) <sup>e</sup>	102 (31)	41.6 ± 15.8	16 (16)	20 (20)	78 (24)
Greece	10	109 (4)	18 (17)	23 (21)	47 (43)	47.1 ± 20.2	14 (30)	16 (34)	41 (38)
Italy	24	237 (8)	61 (26)	73 (31) <sup>e</sup>	89 (38)	43.4 ± 15.3	31 (35)	39 (45) <sup>c</sup>	75 (32)
Netherlands	7	144 (5)	33 (23)	43 (31)	56 (39)	43.8 ± 16.8	18 (32)	25 (47) <sup>c</sup>	49 (34)
Portugal	6	69 (2)	24 (35)	28 (41)	50 (73)	46.2 ± 14.8	16 (32)	19 (38)	44 (64)
Scandinavia <sup>f</sup>	16	209 (7)	29 (14)	51 (24)	74 (35)	41.1 ± 15.7	14 (19)	45 (39)	52 (25)
Spain	13	202 (6)	44 (22) <sup>g</sup>	49 (26) <sup>h</sup>	70 (35)	38.3 ± 17.0	21 (30)	26 (38) <sup>b</sup>	57 (28)
Switzerland	4	114 (4)	9 (8)	16 (14)	20 (18)	38.4 ± 15.4	2 (10)	4 (20)	11 (10)
UK and Ireland	34	457 (15)	122 (27)	154 (34)	236 (52)	42.6 ± 17.6	75 (32)	95 (41)	207 (45)
Total	198	3147	583 (19) <sup>g</sup>	747 (24)	1177 (37)	42.3 ± 16.6	313 (27)	413 (36) <sup>i</sup>	930 (30)



# Sepsis in European intensive care units: Results of the SOAP study\*









# Popolazione complessiva 2010

Pazienti (N)		53611	
<b>Sesso</b>		<b>N</b>	<b>%</b>
	Maschio	31691	59.1
	Femmina	21909	40.9
	Dati non disponibili	11	
<b>Età</b>		<b>N</b>	<b>%</b>
	17 - 45 anni	6897	12.9
	46 - 65 anni	13732	25.6
	66 - 75 anni	14166	26.4
	> 75 anni	18816	35.1
	Dati non disponibili	0	
	<i>Media (DS)</i>	66.4 (16.5)	
<i>Mediana (Q1-Q3)</i>	70 (58 - 79)		
<i>Minimo-massimo</i>	17 - 110		

Patologie coesistenti		<b>N</b>	<b>%</b>
No		8276	15.4
Si		45295	84.6
Dati non disponibili		40	

Prime 10 patologie coesistenti		<b>N</b>	<b>%</b>
Ipertensione		26321	49.1
Aritmia		8179	15.3
Vasculopatia		7367	13.8
Tumore		7160	13.4
Diabete non complicato		6997	13.1
Scompenso cardiaco classe NYHA 1,2,3		6726	12.6
Pneumopatia cronica moderata		6661	12.4
Vasculopatia cerebrale		6411	12.0
Infarto		6190	11.6
Pneumopatia cronica lieve		4584	8.6

Provenienza (Ospedale)		<b>N</b>	<b>%</b>
Stesso ospedale		47688	89.0
Altro ospedale		5916	11.0
Dati non disponibili		7	

Provenienza (Reparto)		<b>N</b>	<b>%</b>
Pronto soccorso		15660	29.2
Reparto chirurgico		26680	49.8
Reparto medico		8221	15.3
Altra TI		3039	5.7
Dati non disponibili		11	

Tipologia		<b>N</b>	<b>%</b>
Medico		25218	47.1
Chirurgico d'elezione		16111	30.1
Chirurgico d'urgenza		12248	22.9
Dati non disponibili		34	

Motivo di ammissione		<b>N</b>	<b>%</b>
MONITORAGGIO-SVEZZAMENTO		20019	37.5
Svezzamento postchirurgico		9071	17.0
Monitoraggio paziente chirurgico		7867	14.7
Monitoraggio paziente medico		3080	5.8
Dati non disponibili		227	
TRATTAMENTO INTENSIVO		33365	62.5
Ins. respiratoria		10454	19.6
Ins. cardio-vascolare		1566	2.9
Ins. neurologica		1051	2.0
Ins. resp. e cardio-vascolare		4804	9.0
Ins. resp. e neurologica		9679	18.1
Ins. cardio-vascolare e neurologica		418	0.8
Ins. resp., cardio-vascolare e neur.		4719	8.8
Altro		674	1.3
Dati non disponibili		0	

# Popolazione Santa Maria Nuova 2010

<b>Pazienti (N)</b>	226	
<b>Sesso</b>	<b>N</b>	<b>%</b>
Maschio	123	54.4
Femmina	103	45.6
Dati non disponibili	0	
<b>Età</b>	<b>N</b>	<b>%</b>
17 - 45 anni	17	7.5
46 - 65 anni	43	19.0
66 - 75 anni	46	20.4
> 75 anni	120	53.1
Dati non disponibili	0	
→ <i>Media (DS)</i>	72.1 (14.5)	
<i>Mediana (Q1-Q3)</i>	76 (64 - 83)	
<i>Minimo-massimo</i>	23 - 96	

<b>Patologie coesistenti</b>	<b>N</b>	<b>%</b>
No	22	9.7
→ Si	204	90.3
Dati non disponibili	0	

<b>Prime 10 patologie coesistenti</b>	<b>N</b>	<b>%</b>
Ipertensione	101	44.7
→ Scopenso cardiaco classe NYHA 1,2,3	48	21.2
Aritmia	45	19.9
Pneumopatia cronica moderata	32	14.2
Diabete non complicato	28	12.4
Tumore	28	12.4
Vasculopatia	28	12.4
Infarto	22	9.7
Vasculopatia cerebrale	21	9.3
Pneumopatia cronica grave	19	8.4

<b>Provenienza (Ospedale)</b>	<b>N</b>	<b>%</b>
Stesso ospedale	192	85.0
Altro ospedale	34	15.0
Dati non disponibili	0	

<b>Provenienza (Reparto)</b>	<b>N</b>	<b>%</b>
Pronto soccorso	63	27.9
Reparto chirurgico	125	55.3
Reparto medico	26	11.5
Altra TI	12	5.3
Dati non disponibili	0	

<b>Tipologia</b>	<b>N</b>	<b>%</b>
Medico	98	43.4
Chirurgico d'elezione	53	23.5
→ Chirurgico d'urgenza	75	33.2
Dati non disponibili	0	

## Caratteristiche della popolazione all'ammissione Popolazione ADULTA

<b>Motivo di ammissione</b>	<b>N</b>	<b>%</b>
<b>MONITORAGGIO-SVEZZAMENTO</b>	94	41.6
Svezzamento postchirurgico	36	15.9
Monitoraggio paziente chirurgico	47	20.8
Monitoraggio paziente medico	11	4.9
Dati non disponibili	0	
<b>TRATTAMENTO INTENSIVO</b>	132	58.4
Ins. respiratoria	37	16.4
Ins. cardio-vascolare	10	4.4
Ins. neurologica	6	2.7
Ins. resp. e cardio-vascolare	25	11.1
Ins. resp. e neurologica	23	10.2
Ins. cardio-vascolare e neurologica	3	1.3
Ins. resp., cardio-vascolare e neur.	16	7.1
Altro	12	5.3
Dati non disponibili	0	
<b>DATI NON DISPONIBILI</b>	0	



# Outcome of community-acquired pneumonia: influence of age, residence status and antimicrobial treatment

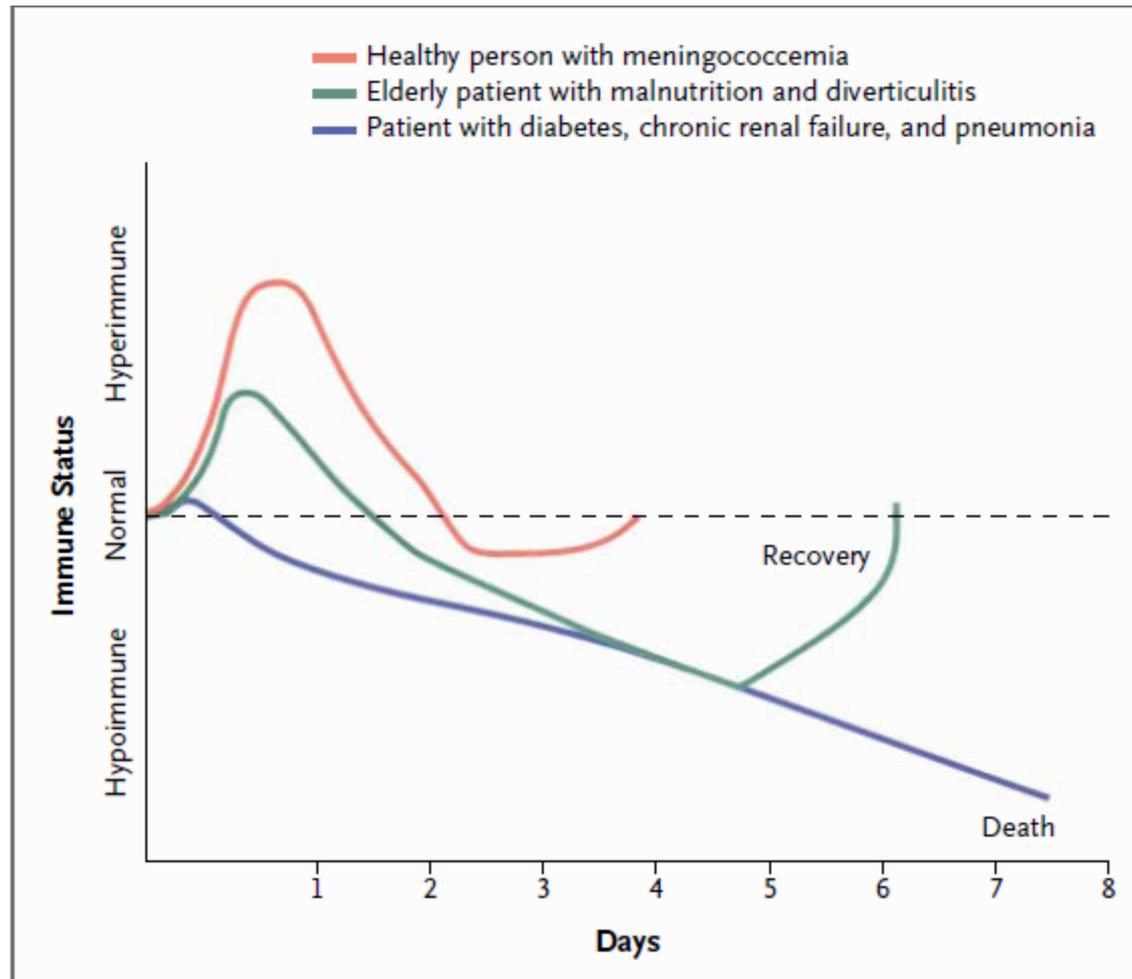
H. Kothe\*, T. Bauer<sup>#</sup>, R. Marre<sup>¶</sup>, N. Suttorp<sup>+</sup>, T. Welte<sup>§</sup>,  
K. Dalhoff\* and the Competence Network for Community-Acquired  
Pneumonia study group<sup>†</sup>

**TABLE 3** Comorbid conditions, residence status and treatment changes

	Age group		p-value
	<65 years	≥65 years	
<b>Subjects n</b>	1298	1349	
<b>CURB score</b>	0.55 ± 0.73	1.03 ± 0.89	<0.001
<b>Comorbid condition</b>			
Chronic pulmonary disease	30.0	42.6	<0.001
Chronic heart disease	12.8	47.2	<0.001
Congestive heart failure	6.4	37.9	<0.001
Chronic liver disease	3.9	3.3	0.46
Chronic kidney failure	2.9	13.3	<0.001
Cerebrovascular disease	4.1	22.3	<0.001
Other neurological disorder	6.6	10.1	0.001
Diabetes mellitus	8.3	28.1	<0.001
<b>Nursing home</b>	3.3	15.2	<0.001
<b>30-day mortality</b>	2.2	10.3	<0.001

**TABLE 4** Univariate analysis of risk factors for 30-day mortality in community-acquired pneumonia patients

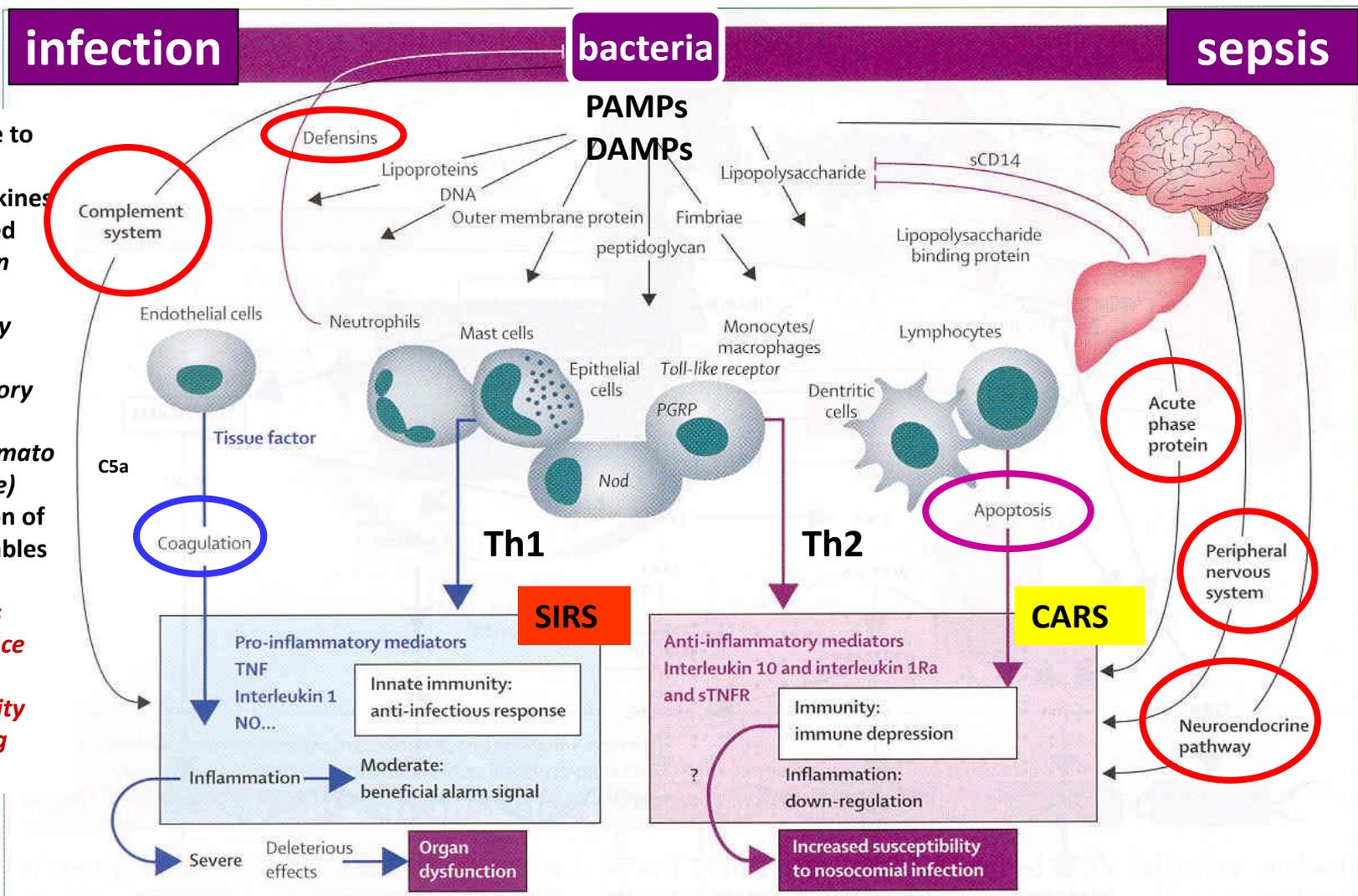
	OR (95% CI)	p-value
<b>Age &lt;65/≥65 yrs</b>	5.03 (3.34–7.56)	<0.001
<b>Comorbid condition</b>		
Chronic pulmonary disease	1.104 (0.80–1.53)	0.560
Chronic heart disease	2.76 (2.01–3.78)	<0.001
Congestive heart failure	4.91 (3.56–6.78)	<0.001
Cerebrovascular disease	5.91 (4.25–8.22)	<0.001
Other neurological disorder	3.86 (2.61–5.69)	<0.001
Chronic liver disease	2.98 (1.67–5.29)	0.001
Chronic kidney failure	4.22 (2.86–6.22)	<0.001
Diabetes mellitus	2.55 (1.83–3.57)	<0.001
<b>Nursing home</b>	8.00 (5.66–11.30)	<0.001
<b>CURB score<sup>#</sup></b>	2.60 (2.10–3.20)	<0.001



## The Pathophysiology and Treatment of Sepsis



Comorbidity	Immune dysfunction
Diabetes mellitus	impaired wound healing, defect in neutrophil function/opsonization of bacteria
Hepatic failure	lack of complement components, decreased proliferation of cells of the immune system
Renal function	defect in neutrophil function, chronically decreased proliferation of cells of the immune system, iron overload
Tumors	lack of immunoglobulin G, defects of cellular immune function
Chronic infections (HIV, HCV, HBV)	chronic immune activation
Autoimmune diseases	connate lack of complement components, immunosuppressive therapy



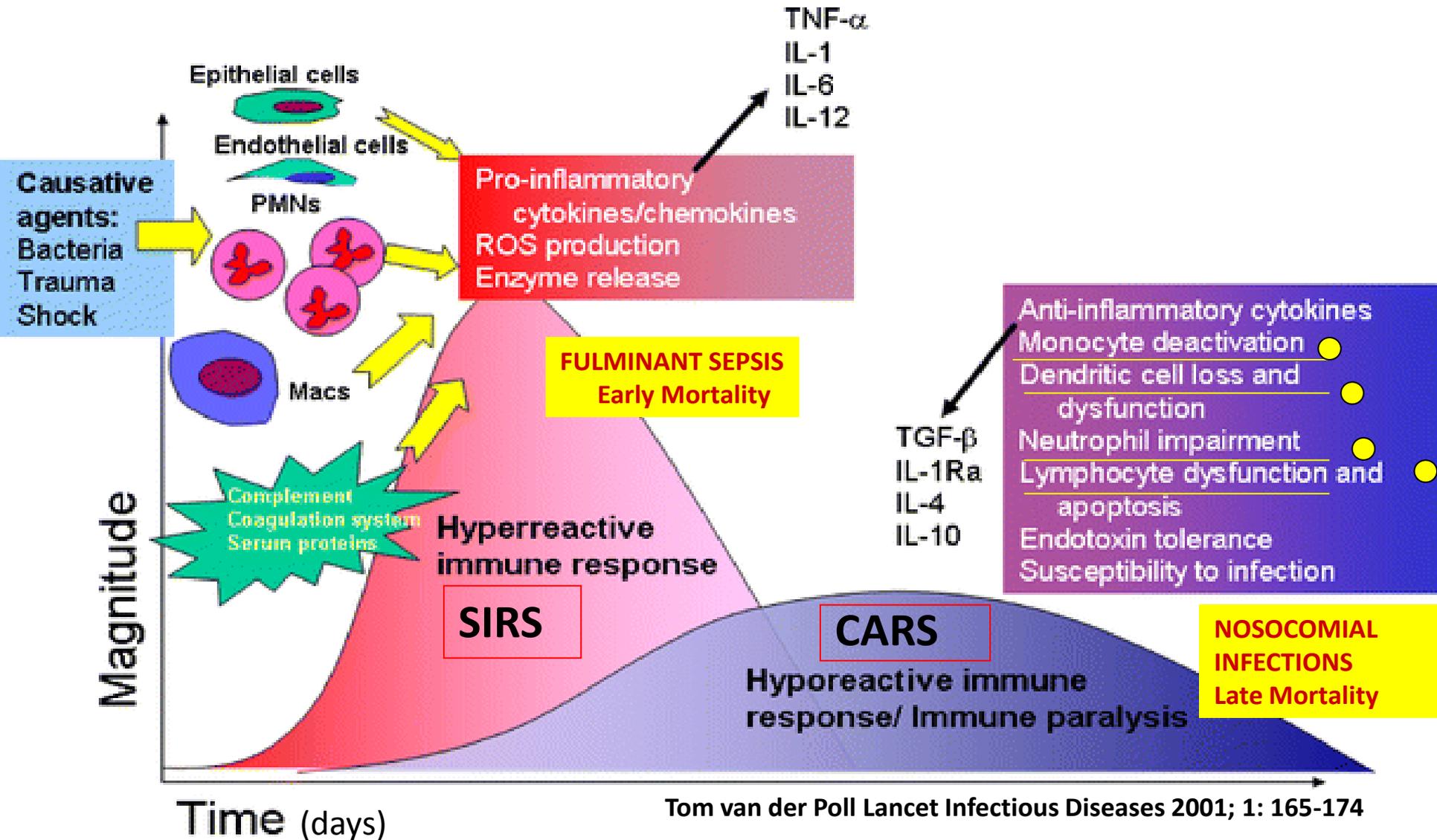
The degree to which these cytokines are released (interaction and redundancy of host inflammatory and antiinflammatory response) is a function of many variables including:

- Infectious circumstance
- Genetic susceptibility
- Coexisting conditions

**From bacteria to disease**  
*Barred lines = inhibition    Arrows = activation and consequences*

# Dynamic of the septic inflammatory response

## The immunologic response to sepsis over time



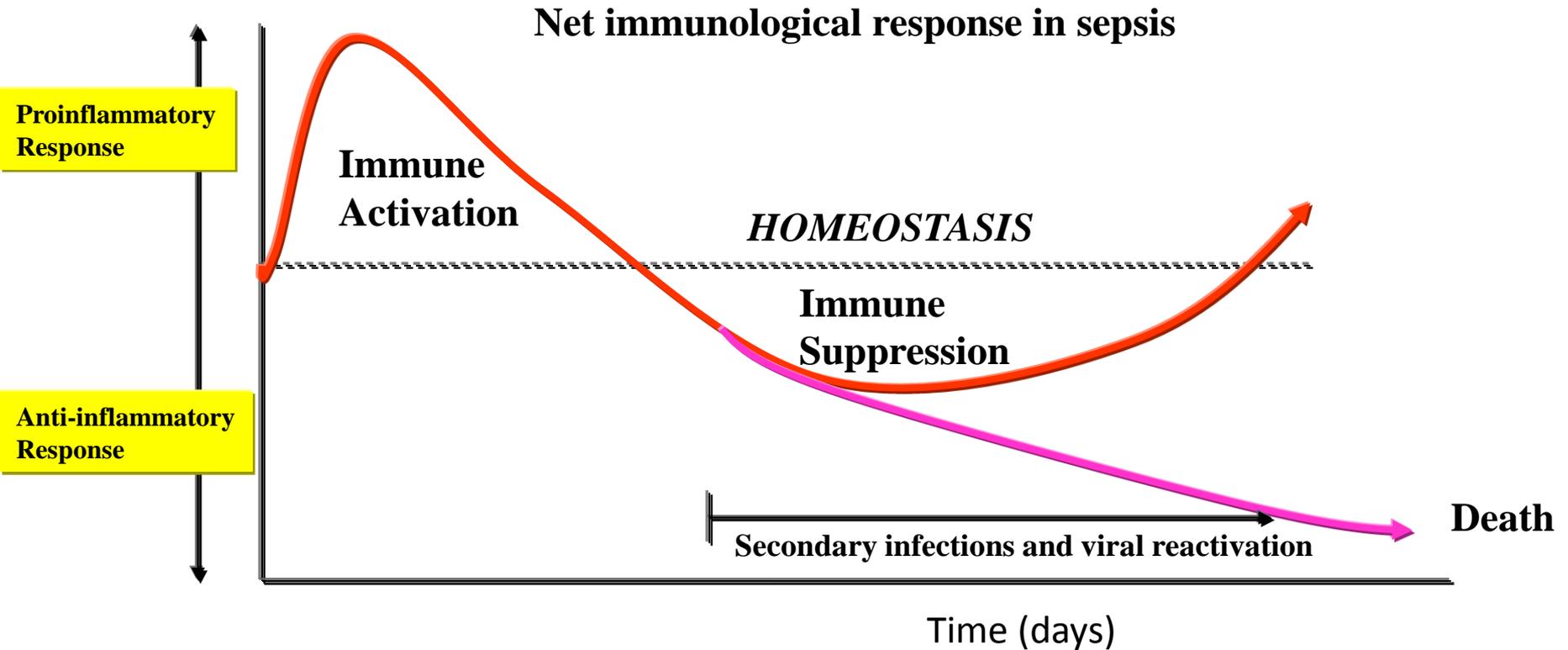
Tom van der Poll Lancet Infectious Diseases 2001; 1: 165-174

Adapted from Riedemann et al, *Nature Med* (2003)



# THE SEPSIS SEESAW

## tilting toward immunosuppression



Although both pro and anti-inflammatory responses are activated early in sepsis, the proinflammatory response predominates. As sepsis progresses the anti-inflammatory response becomes predominant and it is during this later phase that secondary infections and viral reactivation occur. Early deaths during the early proinflammatory response phase are due to cytokine storm-mediated events, whereas later deaths during the anti-inflammatory phase are due to failure to control pathogens

# Frailty in the critically ill: a novel concept



McDermid *et al. Critical Care* 2011, 15:301

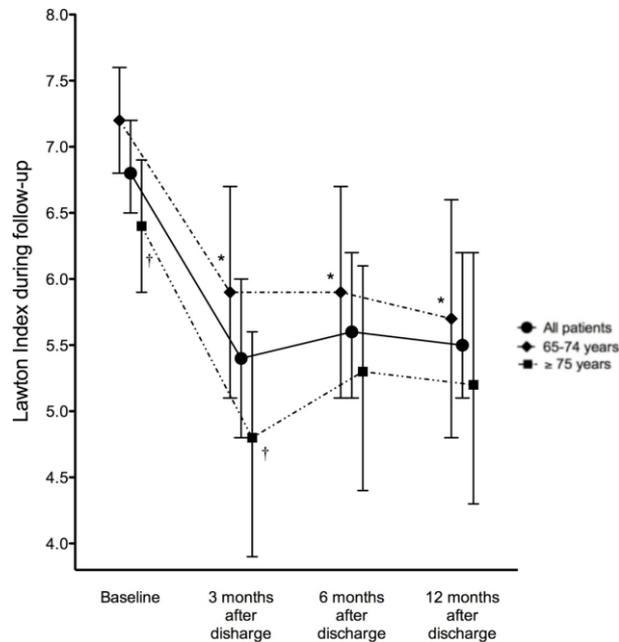
- The prevalence of frailty in the older demographic may be as high as 43% . Based on evidence showing that utilization of intensive care unit (ICU) resources by older people is rising, the prevalence of pre-existing frailty inpatients admitted to the ICU is probably also increasing .
- Deficits associated with frailty, which typically take years to accumulate in the outpatient geriatric population, rapidly develop in a large proportion of critically ill patients independent of age and illness severity. These features include muscle wasting, clinically significant weakness and poor functional status following discharge from the ICU
- Since critically ill patients of all ages may share many of the features seen in frail geriatric patients, we contend that the concept and measurement of frailty may have clinical, psychosocial and economic relevance to critical care medicine.
- Objective evaluation of frailty in critical illness may complement and/or contribute important prognostic information in the clinical care of patients.

# Finalmente a casa ?





# Functional status and quality of life 12 months after discharge from a medical ICU in healthy elderly patients: a prospective observational study



## The Lawton Instrumental Activities of Daily Living Scale

### Ability to Use Telephone

- Operates telephone on own initiative; looks up and dials numbers..... 1
- Dials a few well-known numbers..... 1
- Answers telephone, but does not dial..... 1
- Does not use telephone at all..... 0

### Laundry

- Does personal laundry completely ..... 1
- Launders small items, rinses socks, stockings, etc..... 1
- All laundry must be done by others ..... 0

### Shopping

- Takes care of all shopping needs independently..... 1
- Shops independently for small purchases..... 0
- Needs to be accompanied on any shopping trip ..... 0
- Completely unable to shop ..... 0

### Mode of Transportation

- Travels independently on public transportation or drives own car..... 1
- Arranges own travel via taxi, but does not otherwise use public transportation ..... 1
- Travels on public transportation when assisted or accompanied by another ..... 1
- Travel limited to taxi or automobile with assistance of another..... 0
- Does not travel at all..... 0

### Food Preparation

- Plans, prepares, and serves adequate meals independently..... 1
- Prepares adequate meals if supplied with ingredients ..... 0
- Heats and serves prepared meals or prepares meals but does not maintain adequate diet..... 0
- Needs to have meals prepared and served..... 0

### Responsibility for Own Medications

- Is responsible for taking medication in correct dosages at correct time..... 1
- Takes responsibility if medication is prepared in advance in separate dosages ..... 0
- Is not capable of dispensing own medication ..... 0

### Housekeeping

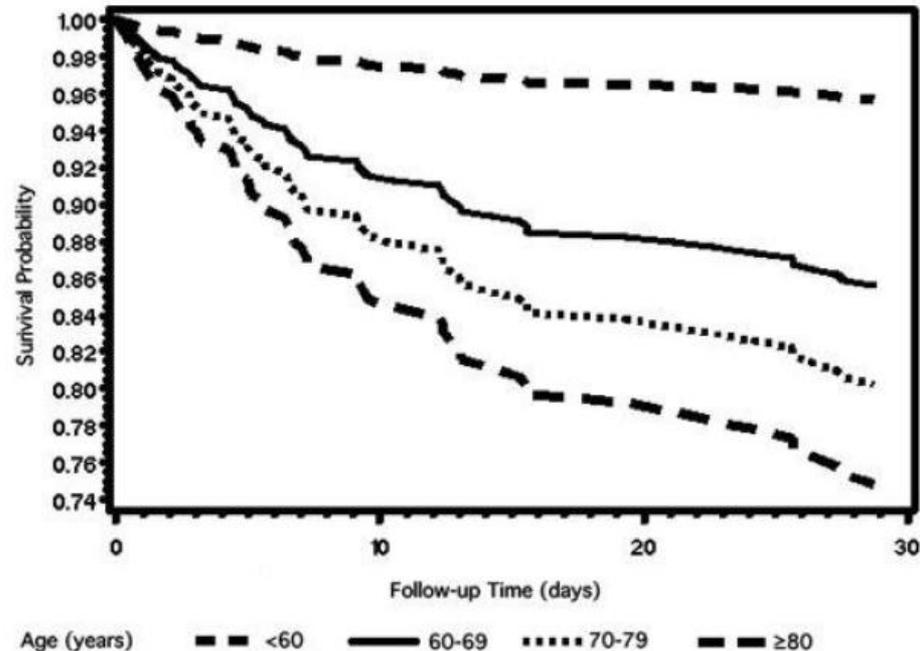
- Maintains house alone with occasion assistance (heavy work)..... 1
- Performs light daily tasks such as dishwashing, bed making..... 1
- Performs light daily tasks, but cannot maintain acceptable level of cleanliness ..... 1
- Needs help with all home maintenance tasks..... 1
- Does not participate in any housekeeping tasks..... 0

### Ability to Handle Finances

- Manages financial matters independently (budgets, writes checks, pays rent and bills, goes to bank); collects and keeps track of income..... 1
- Manages day-to-day purchases, but needs help with banking, major purchases, etc ..... 1
- Incappable of handling money ..... 0

Scoring: For each category, circle the item description that most closely resembles the client's highest functional level (either 0 or 1).

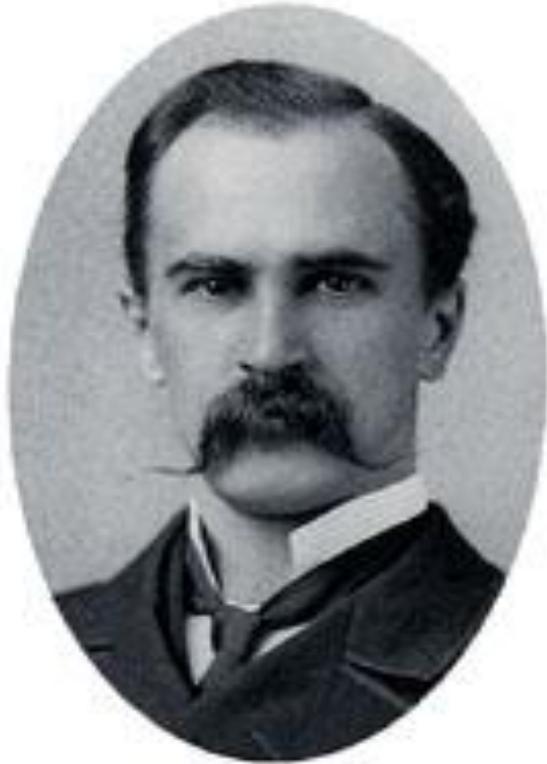
# Age Still Matters: Prognosticating Mortality for Patients With Pneumonia



Source: Crit Care Med © 2010 Lippincott Williams & Wilkins

**Figure 1.** Thirty-day mortality of critically ill patients with pneumonia by age category (adjusted survival curve).

**Conclusions:** Increasing age was independently associated with risk-adjusted short- and long-term mortality in critically ill patients with pneumonia. These findings may help elderly patients, their families, and physicians better understand what intensive care unit admission can offer and help them to make more informed decisions.

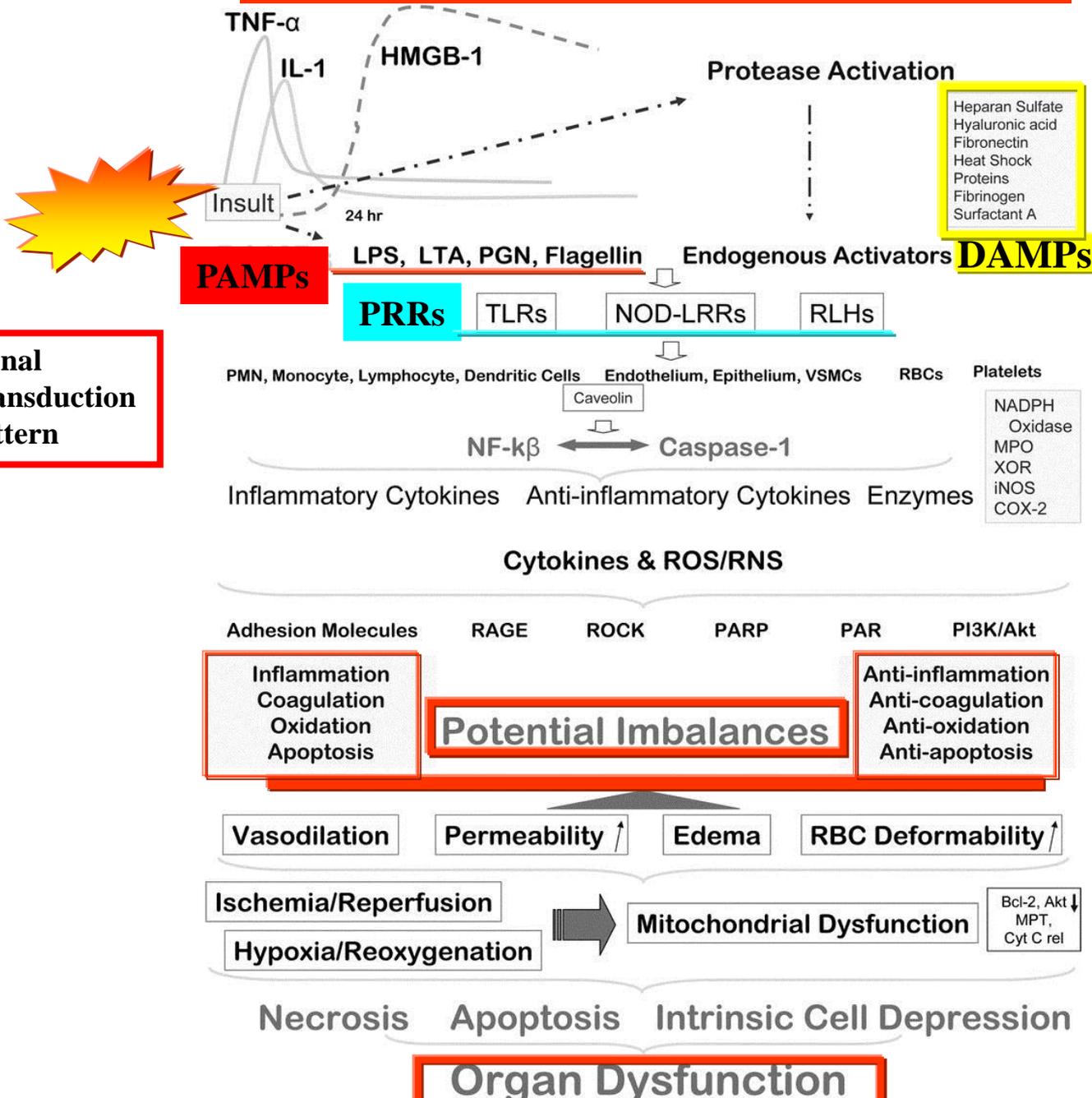


*"Except on few occasions,  
the patient appears to die  
from the body's response  
to infection rather than  
from it."*

**Sir William Osler**  
**"The Evolution of Modern Medicine"**  
**1904**



# Pathogenic Mechanisms Leading to Organ Dysfunction



**Signal  
Transduction  
Pattern**

**PAMPs**

**PRRs**

**DAMPs**

**Potential Imbalances**

**Organ Dysfunction**