

# An international survey: Public awareness and perception of sepsis\*

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**Background:** Sepsis is a common cause of death throughout the world. Early treatment improves outcome; however, treatment may be delayed if the patient does not present himself/herself for medical care until late in the disease process. Lack of knowledge about the syndrome may contribute to delay in presenting for medical care. However, we need to acknowledge the complexity of sepsis. General awareness of sepsis by the public may increase political pressure for research funding. Increased public awareness of acute myocardial infarction has contributed to reduced mortality over the last 50 yrs. This example provides a rationale for future efforts to increase the public awareness of sepsis.

**Objective:** The survey was designed to gain insight into public perceptions and attitudes regarding sepsis.

**Design:** Prospective, international survey performed using structured telephone interviews.

**Subjects:** A total of 6021 interviewees, 5021 in Europe and 1000 in the United States.

**Measurements and Main Results:** In Italy, Spain, the United Kingdom, France and the United States, a mean of 88% of interviewees had never heard of the term "sepsis". In Germany 53% of people knew the word sepsis. In Italy, Spain, United Kingdom, France, and United States, of people who recognized the term sepsis, 58% did not recognize that sepsis is a leading cause of death.

**Conclusions:** There is poor public awareness about the existence of a syndrome known as sepsis. Results of this questionnaire underscore the challenges in early management and treatment of infected patients at risk for developing sepsis syndrome. (Crit Care Med 2009; 37:167-170)

**KEY WORDS:** sepsis; severe sepsis; septic shock; public awareness; international survey

Sepsis is a potentially life-threatening disorder which is increasing in frequency. There are an estimated 215,000 deaths per year in the United States alone (1). Sepsis has been defined by the Society of Critical Care Medicine (SCCM) and American College of Chest Physicians Consensus Conference as the systemic inflammatory response syndrome caused by infection (2). Severe sepsis and septic shock are progressively more severe results of the syndrome and include the development of organ dys-

function and/or hypotension. Severe sepsis and septic shock rank among other healthcare challenges such as acute myocardial infarction (AMI) (3, 4), stroke (5), and ruptured abdominal aortic aneurysm (6, 7) as disorders with a significant mortality rate (Table 1). However, unlike the other disorders, sepsis syndrome is not widely recognized by the general public.

Cardiologists have worked for more than 50 yrs to increase public awareness of AMI. Treatment for AMI has improved dramatically over the past decade, and mortality has decreased significantly during this time (3, 4) in part due to widespread public awareness of the symptoms and the need for rapid treatment. Since patients with AMI know the symptoms and the need for rapid treatment, they present to the hospital promptly, within the time frame that treatment will be most effective. Like the management of AMI, the management of sepsis in hospitals is significantly better today than it was 30 years ago (1, 8, 9, 12). Among the recent advances that have demonstrated improved outcome with early treatment are early goal-directed therapy and prompt administration of antibiotics (13-16). Despite the improvements in treatment, there has been a rapid increase in the rates of hospitalization and mortality for severe sepsis in the United States (17).

Achieving significant mortality reductions in sepsis seems as difficult today as similar reductions in AMI-associated mortality appeared 50 years ago. Many studies have demonstrated very limited public knowledge about critical conditions (18, 19), which need timely interventions. Public advocacy can play an important role in increasing public awareness and leading to demands for improvement in approaches to treatment (20). The importance of involvement of the entire healthcare system, combined with strong public and political support, in accomplishing the goal of reducing mortality in the septic patient population cannot be stressed enough. In 2002, the European Society of Intensive Care Medicine, the SCCM, and the International Sepsis Forum collaborated in an international effort to decrease the mortality from sepsis by 25% in 5 years. This effort is known as the Surviving Sepsis Campaign. As part of the Campaign, we developed an international survey to assess public awareness and perception of sepsis syndrome.

## MATERIALS AND METHODS

The survey was conducted between December 30, 2002 and January 24, 2003 in France, Germany, United Kingdom, Italy, Spain, and the United States. The questionnaire was de-

### \*See also p. 352.

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**Table 1.** Mortality rates because of sepsis, acute myocardial infarction, stroke and ruptured abdominal aortic aneurysm from clinical trial data (1, 5, 7–11)

Acute Condition	Mortality Rate (%)
Ruptured abdominal aortic aneurysm	50.0–73.3 <sup>a</sup>
Sepsis	28–50 <sup>b</sup>
Stroke	9.3 <sup>c</sup>
Acute myocardial infarction	2.7–9.6 <sup>d</sup>

<sup>a</sup>Operative mortality rates; <sup>b</sup>28-day mortality; <sup>c</sup>14-day mortality amongst patients receiving standard care treatment in the International Stroke Trial; <sup>d</sup>30-day in-hospital mortality rates indicated by literature review of clinical trial data.

veloped by the European Society of Intensive Care Medicine and the SCCM, and the survey was performed by a professional survey company (Market and Opinion Research International). The questionnaire included only four questions, which are listed in the results. Interviewees were all above the age of 16 yrs. Interviewees were selected by random telephone numbers and were interviewed by telephone. The data are presented as percentages.

## RESULTS

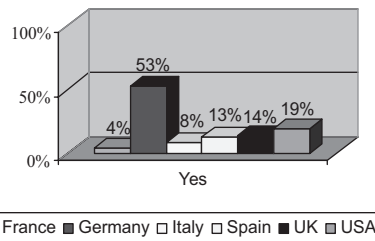
A total of 6021 people were interviewed, 5021 in Europe (1007 in France, 1004 in Germany, 1003 in Italy, 1015 in Spain and 1003 in the United Kingdom) and 1000 in the United States.

### Question 1 was “Have You Heard of the Term ‘Sepsis,’ or Not?”

In 5 of the 6 countries, the percentage of those interviewed who knew of the term sepsis was very low, ranging from 4% in France to 19% in the United States. In contrast, 53% of those polled in Germany had heard of the term sepsis (see Fig. 1).

### People Who Had Answered Yes to Question Number 1 Were Asked to Describe Sepsis, Choosing from the Possibilities Listed in Table 2

On average, 32% of interviewees were not able to define sepsis, despite having heard of the term. In the United Kingdom, people selected an acceptable answer in 38% of cases and in France in 39% of cases. In the United States, 44% of interviewees selected an acceptable definition of sepsis. In Italy only 8% of the



**Figure 1.** Percentage of people who have heard the term sepsis in each country.

population were aware of the term sepsis, but 47% of them defined it appropriately. In Spain 13% of interviewees were familiar with the term sepsis and 42% selected at least one acceptable definition. Surprisingly, 53% of Germans were familiar with the term sepsis; 77% of those who had heard the term sepsis provided a definition, but only 22% of these definitions included at least one acceptable answer (see Table 2).

### Question 3, “Where Did You Hear About Sepsis?” Was Only Asked to Those Who Answered Yes to Question 1

The majority of people in all countries learned about sepsis from the media (see Table 3).

### Question 4, “Roughly How Many People Would You Say Die of Sepsis Around the World Each Day?”

This was again only asked of interviewees who had heard of the term sepsis. According to data collected using this questionnaire, on average, 58% of interviewees did not know how many people die each day from sepsis, with over 40% in each country responding “Do not know.” The response to this question emphasizes the lack of knowledge the public has about the significance of sepsis as a public health problem.

## DISCUSSION

Severe sepsis is the leading cause of death in noncoronary intensive care units (2). Data from this survey show that 81% of the United States population have never heard of the term sepsis, despite the fact that 1400 citizens die worldwide every day from this syndrome (2). It is surprising that a disease process that is so common and so deadly remains almost unknown. Some estimates suggest that

the incidence of sepsis has increased by up to 90% over the last ten years (1, 8, 9, 17), and the number of severe sepsis cases is expected to grow at a rate of 1.5% per year. The progression along the sepsis syndrome continuum is subtle yet deadly. The complexities of this disease process require a combination of therapeutic approaches addressing the multiple organ systems typically involved. Understandably, no single therapy alone has proven effective. The lack of knowledge about the syndrome of sepsis decreases the ability of the public to recognize symptoms of sepsis and present for medical care early, when it is most treatable. An international survey of 1058 physicians, conducted with the aim of evaluating physicians’ knowledge and perception about sepsis, reported their difficulty in defining and diagnosing the disease process (21). Not more than 17% of doctors interviewed in France, Germany, Italy, Spain, the United Kingdom, and the United States agreed on any definition of sepsis. Two thirds expressed concern that a common definition is lacking, and 83% felt that sepsis is likely missed frequently. Given the difficulty that physicians have with defining sepsis, it becomes easy to understand the lack of public awareness about sepsis in these countries. The physicians contacted in the doctors’ survey were not only intensive care specialists but also anesthesiologists, cardiologists, endocrinologists, internists, nephrologists, pulmonologists, surgeons, and emergency room physicians. All these specialists may be involved in the treatment of severe sepsis or septic shock, but none of them was confident with the definition of sepsis. In the doctors’ survey, 81% of physicians felt that communicating the diagnosis of sepsis to families is difficult. It is likely that the lack of agreement regarding the definition of sepsis influences the ability of physicians to communicate about sepsis. The lack of a uniform definition might suggest that the word “sepsis” is normally not used by physicians during family meetings. Furthermore, symptoms of sepsis are often related to other diseases. Some data suggest that 46% of sepsis deaths are recorded as death due to the underlying disease, rather than death by sepsis (8–10). It is less surprising in this context that so few of the lay public have heard about or understand the meaning of sepsis. The lack of public knowledge about sepsis may partly explain the relatively small amount of resources put into research in

Table 2. Definitions chosen by interviewees who had heard of sepsis

Base: All who have Heard of Sepsis	France (n = 40)	Germany (n = 547)	Italy (n = 88)	Spain (n = 129)	UK (n = 139)	USA (n = 215)
Any response	57%	77%	63%	70%	62%	73%
Any correct	39%	22%	47%	42%	38%	44%
An allergy	0%	1%	+	4%	0%	0%
Bacteria	0%	2%	4%	9%	2%	5%
Blood poisoning	2%	25%	0%	5%	12%	9%
Septicaemia/leads to septicaemia	5%	+	4%	2%	5%	1%
Septic shock/leads to septic shock	0%	1%	2%	2%	+	1%
Infection (unspecified)	32%	10%	32%	28%	27%	30%
Infection of a wound	0%	7%	5%	3%	6%	2%
Infection of body tissues	5%	2%	4%	4%	3%	7%
Inflammation	2%	16%	3%	1%	2%	+
The body's response to infection	0%	2%	0%	4%	1%	1%
Pus/Pus in the body	0%	3%	1%	1%	0%	0%
Other	18%	20%	11%	5%	9%	11%
Don't know	43%	23%	36%	30%	38%	27%

A plus (“+”) indicates a percentage less than 0.5%, but greater than zero. Where figures do not add up to 100%, this is due to computer rounding or multiple answers.

Table 3. List of places where people learned about the term sepsis

Base: All who Have Heard of Sepsis	France (n = 40)	Germany (n = 547)	Italy (n = 88)	Spain (n = 129)	UK (n = 139)	USA (n = 215)
Any response <sup>a</sup>	72%	78%	87%	76%	75%	75%
Biology lesson(s)	2%	2%	4%	5%	8%	0%
At School (unspecified)	3%	3%	1%	5%	7%	9%
At College (unspecified)	0%	1%	1%	2%	1%	1%
At University	5%	1%	13%	9%	1%	1%
Friend/relative	5%	5%	8%	5%	6%	3%
Friend/relative has been affected	0%	4%	0%	3%	1%	2%
I have personally been affected	0%	1%	0%	0%	0%	1%
In the media	28%	25%	33%	12%	26%	18%
On the internet	0%	0%	1%	1%	0%	0%
Medical person/health professional in the family	7%	13%	6%	6%	6%	5%
I am a doctor/nurse/other health professional	17%	7%	19%	23%	14%	20%
Other	8%	23%	6%	2%	8%	15%
None of these	5%	4%	1%	0%	5%	7%
Don't know	23%	17%	12%	24%	20%	18%

<sup>a</sup>More than one response possible.

the area, as well as the lack of public demand for improvement. It is notable that in Germany a much higher percentage of people responding to the questionnaire had heard of the term sepsis than in any of the other countries included in the survey. The National Health Care System in Germany has provided resources to improve education of the public with regard to sepsis. This government-supported effort has increased the “word recognition” of the public with regard to sepsis, but there is still poor understanding of what the term means, with only 22% of those in Germany who had heard the term sepsis giving an acceptable answer for what the term means. Few interviewees in this survey knew the meaning and importance of sepsis. It is

debatable whether such knowledge is necessary for the public to recognize symptoms of sepsis, and thus help reduce mortality by seeking medical help earlier. Given the complexity of the syndrome, that is unlikely. However, it is interesting to consider some similarities between sepsis and AMI. In the 1960s, in-hospital AMI-associated mortality rates were ~25% to 30% (11). Currently, 30-day in-hospital mortality rates range from 2.7% to 9.6% in those patients who receive timely medical care (2, 3). Early recognition and treatment of these patients has been a key component in the significant and consistent reduction in mortality rate. A study in Gothenburg, Sweden, demonstrated that a 1-yr education campaign was associated with a significant

reduction in median delay time from 180 to 138 mins among patients with confirmed AMI (22). A public campaign in Geneva, Switzerland, was associated with a similar reduction of median delay time for patients with confirmed AMI from 196 to 144 mins (23). Public understanding of AMI has contributed to the reduced time between the onset of clinical symptoms and patient hospitalization. Early recognition and treatment of these patients have been one of the major factors leading to a reduction in mortality rate.

Public awareness in oncology, as well as in acquired immune deficiency syndrome (AIDS), has led to political pressure to support research in the field, and enhanced the ability of private organizations to raise funding for research (20, 24). The result has been a decrease in mortality for some kinds of cancer and for AIDS (20, 24). Physicians have the potential to reach a critical point in the management of severe sepsis and septic shock. The Surviving Sepsis Campaign has produced evidence-based guidelines to assist in the treatment of severe sepsis and septic shock (25–28). The question leading to this survey is whether we should also be targeting the public to help them recognize symptoms of sepsis earlier. Given the example of cardiology and the improvement in mortality from AMI, we could conclude that a better knowledge of sepsis among the general public in each country would help to reduce the mortality rate. The effectiveness of public pressure leading to funding for research in oncology and AIDS supports the hypothesis that improved public recognition of the importance of sepsis as a major cause of mortality would lead to improved availability of funding for sepsis. When asked “where did you hear about sepsis,” the majority of people answered through the media. Working with the media to educate the public about sepsis, as has been done with AMI and stroke, may be an important early step in the efforts to decrease mortality from this very common syndrome. This study has some inherent limitations. The survey was performed using random telephone numbers. The responses may or may not reflect the level of knowledge of people who do not have telephone numbers listed. It seems unlikely to us that people without telephones would have a greater awareness of sepsis than people with telephones, but this is an assumption. There are no demographic data available to us other than the age was over 16 yrs. We do

not know the total number of telephone calls made by Market and Opinion Research International, and so we do not know the response rate to this survey.

## CONCLUSION

This survey was designed to examine whether members of the public recognized the term sepsis, and its implication. Public knowledge about sepsis is very limited in most countries. Improving public knowledge about sepsis, through education and through media efforts is unlikely to have the same effect as in AMI, given the complexity of sepsis. However, increased public awareness of the seriousness and frequency of sepsis would be expected to be helpful in generating funding for research, both through political pressure and through philanthropy.

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