

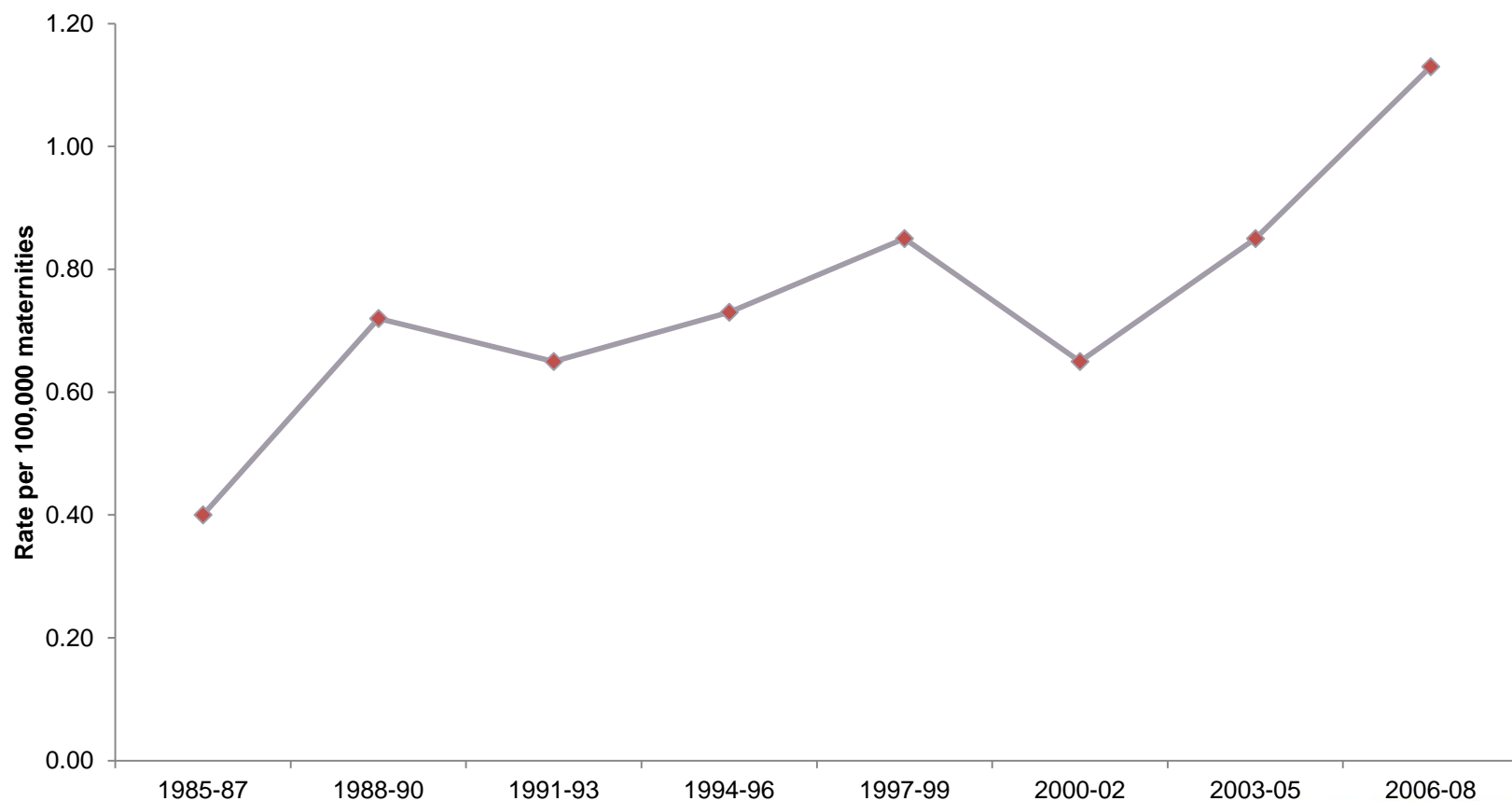


Risk Factors for Severe Maternal Sepsis in the UK

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Deaths from genital tract sepsis UK 1985-2008



Study Objectives

- In addition to deaths, how many mothers become critically ill due to sepsis in the UK?
- What are the risk factors?
- Are there any risk factors associated with poor outcomes?

Methods

- National case-control study using UKOSS
- Data on 2 controls per every case
- Data collection June 2011 – June 2012

Case definition

1. Death related to infection or suspected infection
2. Any women requiring level 2 or level 3 critical care (or obstetric HDU type care) with severe sepsis or suspected severe sepsis
3. A clinical diagnosis of severe sepsis:
 - a) Temperature $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$, measured on two occasions at least 4 hours apart
 - b) Heart rate >100 beats/minute, measured on two occasions at least 4 hours apart
 - c) Respiratory rate >20 /minute, measured on two occasions at least 4 hours apart
 - d) White cell count $>17 \times 10^9/\text{L}$ or $<4 \times 10^9/\text{L}$ or with $>10\%$ immature band forms, measured on 2 occasions

Incidence

- 100% participation (all 221 UK hospitals with obstetrician-led maternity units)
- **365** cases of severe sepsis
 - Severe sepsis: **4.7 / 10,000** maternities (95% CI 4.2-5.2)
- **71** cases with septic shock
 - Septic shock: **0.91 / 10,000** maternities (95% CI 0.71-1.15)

Possible risk factors evaluated

Sociodemographic	Obstetric and medical history	Delivery
<p>Age (years)</p> <p>Ethnic group</p> <p>Socio-economic group</p> <p>Marrital status</p>	<p>Late booking</p> <p>Parity</p> <p>Previous caesarean deliveries</p> <p>Previous pregnancy problems</p> <p>Multiple pregnancy</p> <p>Smoked during pregnancy</p> <p>BMI at booking (kg/m²)</p> <p>Diabetes</p> <p>History of pyelonephritis/ UTI</p> <p>History of STI</p> <p>Pre-existing medical problems</p> <p>Invasive antenatal procedures</p> <p>Febrile illness or antibiotics in 2 wks before delivery</p>	<p>Premature rupture of membranes</p> <p>>5 vaginal examinations</p> <p>Fetal blood sampling</p> <p>Fetal scalp electrode</p> <p>Labour induction</p> <p>Catheters/ lines</p> <p>Mode of delivery</p> <p>Complications of delivery</p>

Significant sociodemographic risk factors

	Cases n (%)	Controls n (%)	aOR 95% CI
	n=365	n=757	
Ethnic group			
White	221 (61)	525 (70)	1
Black and other minority	143 (39)	230 (30)	1.8 (1.3-2.5)

*Adjusted for all other factors examined

Significant medical risk factors

	Cases n (%) n=365	Controls n (%) n=757	aOR* 95% CI
Parity			
0	197 (54)	330 (44)	1.6 (1.2-2.2)
≥1	167 (46)	427 (56)	1
Pre-existing medical problems			
Yes	120 (33)	171 (23)	1.4 (1.0-1.9)
No	245 (67)	583 (77)	1
Febrile illness or antibiotics in 2 wks before delivery			
Yes	153 (42)	42 (6)	12.1 (8.1-18.0)
No	212 (58)	715 (94)	1

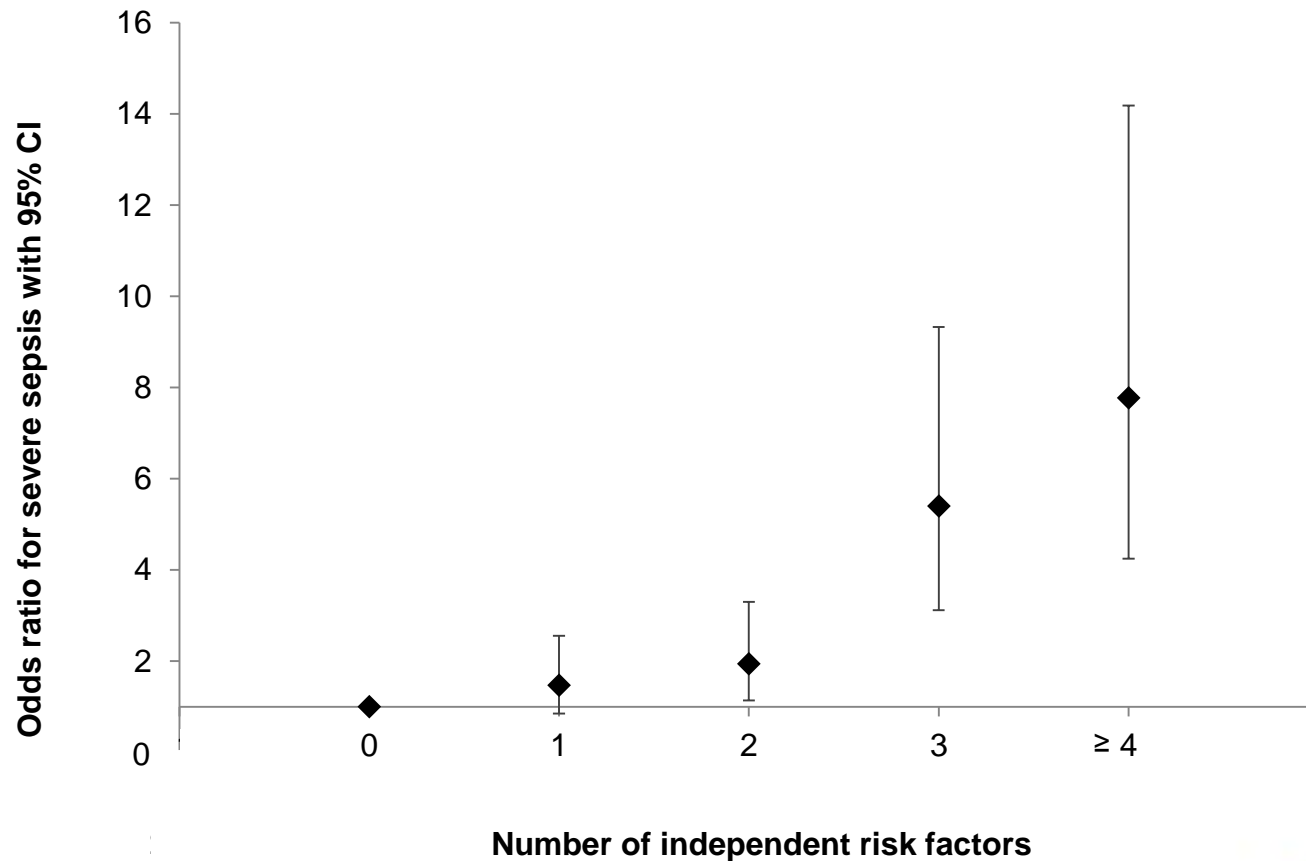
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Significant delivery risk factors

	Postpartum cases n (%) n=302	Controls n (%) n=757	aOR* 95% CI
Mode of delivery			
Spontaneous vaginal	57 (21)	443 (59)	1
Operative vaginal	39 (14)	100 (13)	3.4 (1.7-7.0)
Pre-labour caesarean	67 (25)	119 (16)	3.5 (2.0-6.1)
Caesarean after labour onset	108 (40)	92 (12)	6.7 (3.8-12.0)
Complications of delivery			
Yes	103 (34)	279 (37)	1.7 (1.1-2.5)
No	199 (66)	478 (63)	1

*Adjusted for all other factors examined

Cumulative effect of risk factors



Risk factors for septic shock

	Septic shock n (%) n=71	Severe sepsis without shock n (%) n=294	aOR 95% CI
Group A strep infection			
Yes	16 (23)	16 (5)	4.8 (2.2-10.8)
No	55 (77)	278 (95)	1

- Spontaneous and operative vaginal delivery significantly associated before adjustment for Group A strep

Conclusions

- For each maternal sepsis death, approximately 50 women have life-threatening morbidity.
- All modes of operative delivery were major risk factors for severe sepsis – implications for timing of antibiotics and stringent attention to infection control.
- Black or minority ethnic status, primiparity and caesarean section are all common in the UK – odds of severe sepsis increases with increasing number of risk factors (~8X in the presence of ≥ 4 factors).
- Group A strep infection is an obstetric emergency – consideration for inclusion in obstetric emergency training courses.

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