

# SEPSIS

Dr. Alice Thomas



# Which patient has sepsis?

1



2

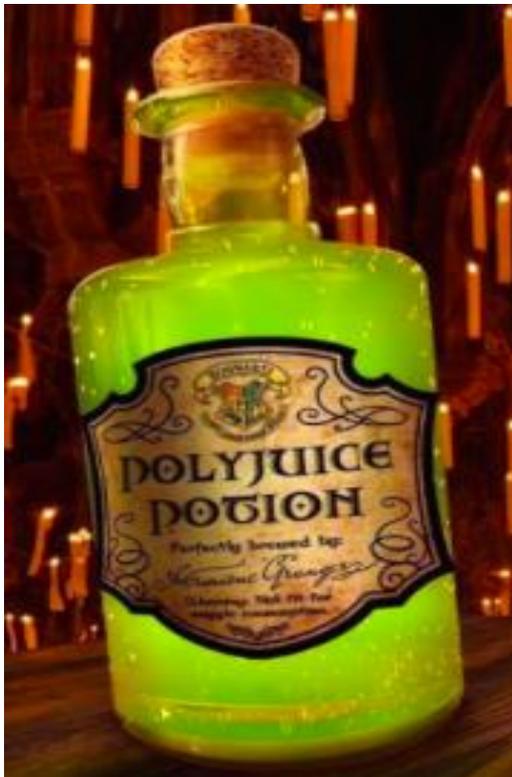
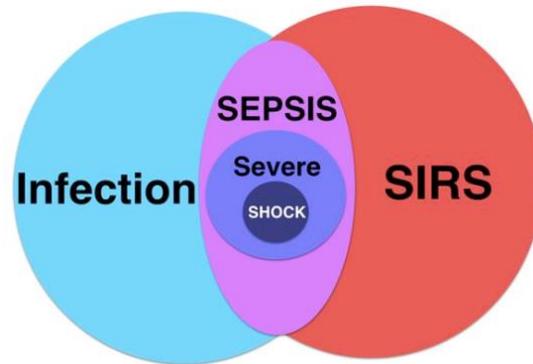


# Outline

- Old Definitions: SIRS/Sepsis/Severe Sepsis/SHOCK
- New Definitions: SEPSIS 3
- Recognition
- Investigations
- Management: SEPSIS 6
- SBAR



# Definitions



# Sepsis 2: Old Definitions

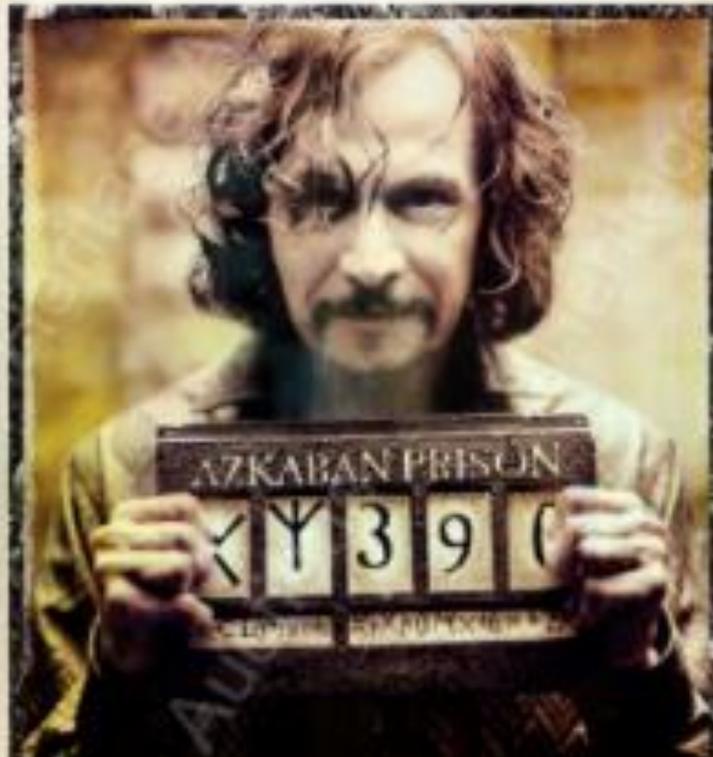
- **SIRS**: Systemic Inflammatory response syndrome (=2/4)



- **W**-WCC  $<4 >12$
- **H**-Heart rate  $>90$
- **A**-Air Entry(Resp rate)  $>20$
- **T**-Temperature  $<36 >38$

- **Sepsis** (+ infective cause)
- **Severe sepsis** (+ organ dysfunction)
- **Septic Shock** (+ persistent hypotension)

Have you seen the new  
**REDEFINING SEPSIS**  
Guidelines?



2016

*Critical Care Congress*

 **SIMPLY**  
*FINALS*

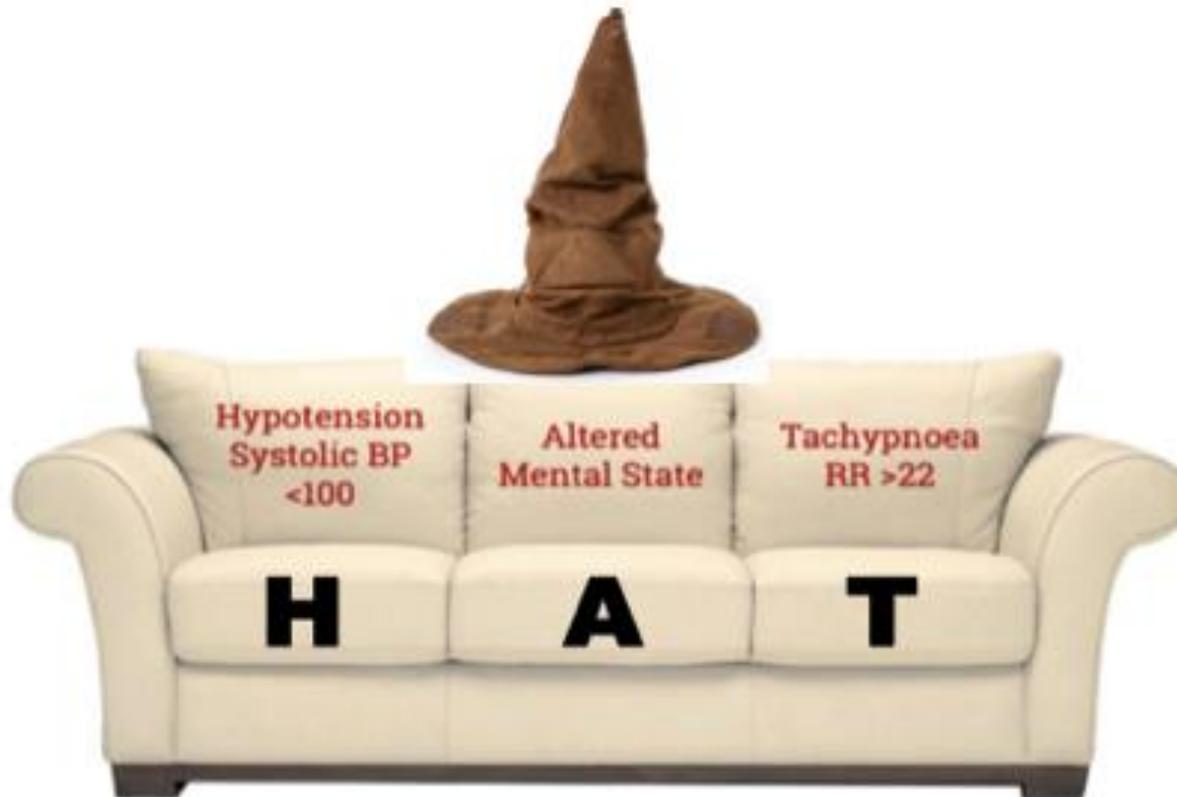
# SEPSIS 3

‘A life-threatening organ dysfunction due to a deregulated host response to infection.’



# Sepsis=

- 1) Do you suspect **infection**?
- 2) **qSOFA** (*quick* Sepsis related **O**rgan **F**ailure **A**ssessment) (=2/3)



**Mortality=**  
**10%**

# qSOFA → SOFA criteria



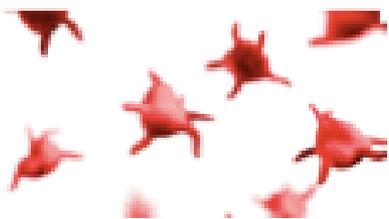
H



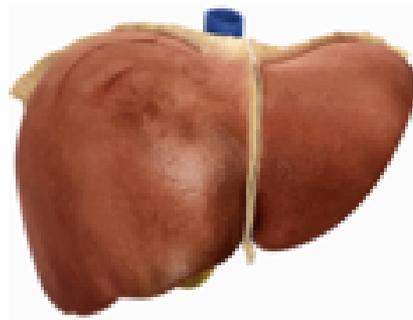
A



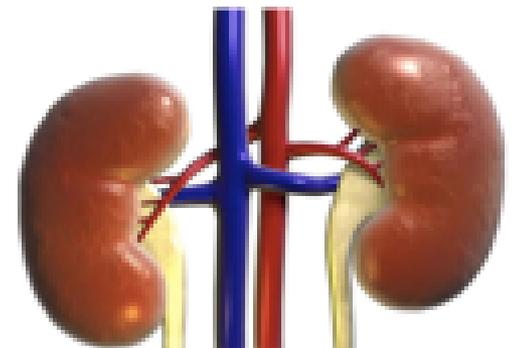
T



Platelets ↓



Bilirubin ↑

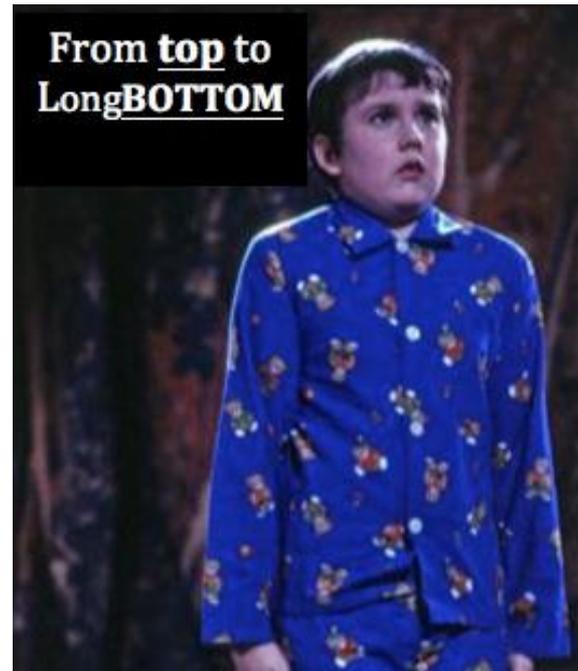


Creatinine ↑

# Infections

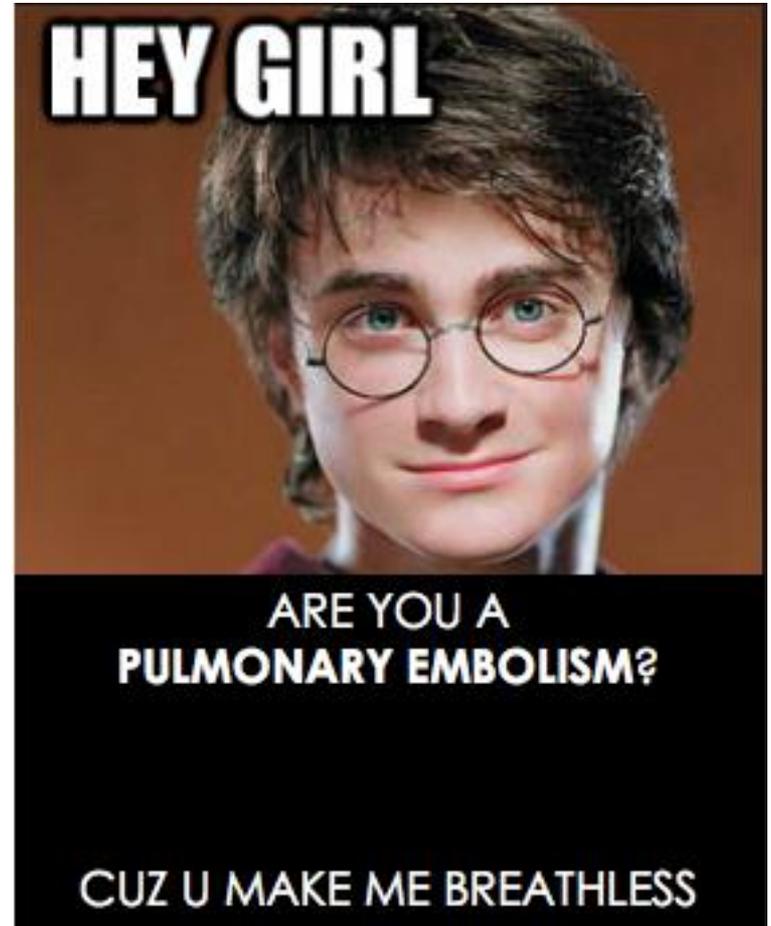
## Bacteria/ Virus/ Fungus/ Parasite

- Temperature?
- Headache/ ENT/ Eyes
- Lungs/endocarditis
- GI/ Gall bladder/spleen
- Kidneys
- Pelvis: STI, prostatitis
- Skin/Wound Infection
- Joints
- Lines/ catheters



# No Infection

- Pulmonary Embolism
- Anaphylaxis
- Trauma
- Burns
- Thyroid toxicosis
- Acute pancreatitis
- Heart failure



# Recognition

## MAGIC!:

### Monitoring

### Assessment

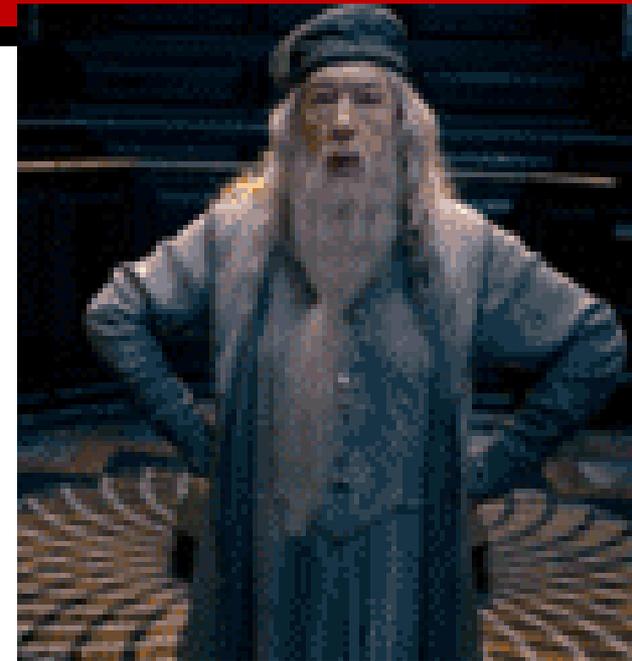
- History (**SAMPLE**)
- Examination

### Get

### IV access:

- Blue/Yellow/Purple
- Relevant (cultures, G+S)
- Blood gas

### Call help



**S**-igns + Sx

**A**-llergies

**M**-edications

**P**-MH

**L**-ast ate

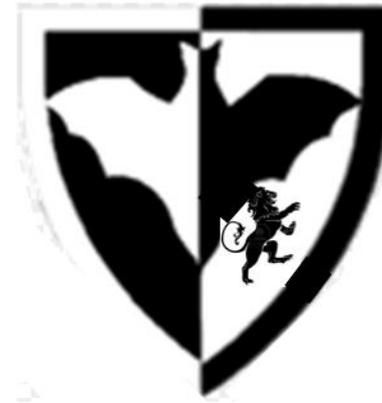
**E**-vents



Bed 7



# St Bats and The Royal Lion's-Den



# Mr R.H

- PMH:

- Acromegaly
- Diabetes
- HTN
- Gout

FH: Unknown

SH:

- Lives alone
- Dog
- Drinks: 32 units a week

- Meds:

- Amlodipine
- Metformin
- Allopurinol

- Allergies: **Penicillin**



# Management: SEPSIS 6

## 3 OUT

1. Blood Cultures
1. Lactate
2. Urine output



## 3 IN

1. O<sub>2</sub>
2. Iv Fluids
3. Antibiotics



# Differential diagnosis.....?



# SEPTIC SHOCK=

Sepsis (and despite fluid resuscitation):

- 1) Persistent hypotension (MAP <65)
- 2) Lactate  $\geq 2$  mmol/L

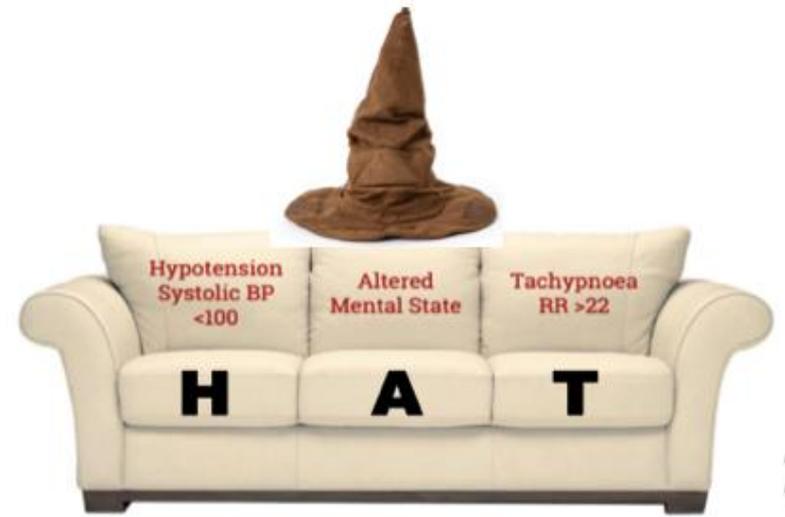
**Mortality=**  
**40%**



# Recap: Sepsis 3

## 1) SEPSIS:

- I suspect **infection** + 2/3 of



Mortality=  
10%

## 2) SEPTIC SHOCK:

- Despite fluids **MAP <65** or
- **Lactate >2** mmol/L

Mortality=  
40%

# Bacteria Revision:

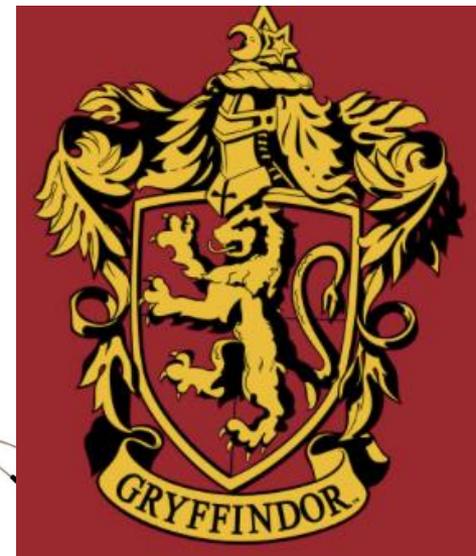
- Gram **P**ositive

- Cocci: staph, strep, enterococci
- Rods: **ABCD-L**

- *Actinomyces*
- *Bacillus anthracis* (anthrax)
- *Clostridium*
- Diphtheria
- *Listeria*

- Gram **N**egative

- Cocci: **N**esseria gonorrhoeae/  
**N**. meningitidis, **M**oraxella
- Rods: **R**est



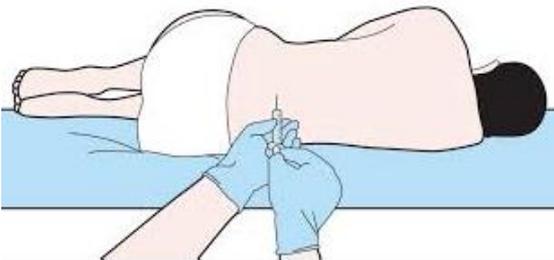
# Pathophysiology



# Investigations

- **Septic screen:**

- Blood cultures
- CXR
- Urine dip
- Swab
- Lumbar Puncture
- CT scan



# Antibiotics

Likely focus	First Line Agent – If contra-indicated seek microbiology advice
<b>Severe Sepsis or Septic Shock</b>	
Unknown (community)	<b>Ceftriaxone</b> 2 g bd iv
Unknown (hospital)	Seek microbiology advice
Respiratory - community	<b>Co-amoxiclav</b> 1.2 g tds iv <b>AND</b> Clarithromycin 500 mg bd iv
Respiratory - hospital	<b>Tazocin</b> 4.5 g tds iv <b>AND (if MRSA sputum)</b> Vancomycin iv as per <a href="#">chart</a>
Respiratory - aspiration	<b>Co-amoxiclav</b> 1.2 g tds iv <b>AND</b> Metronidazole 500 mg tds iv
UTI	<b>Co-amoxiclav</b> 1.2 g tds iv <b>AND</b> Gentamicin 5 - 7 mg/kg od iv
Abdominal	<b>Tazocin</b> 4.5 g tds iv <b>AND</b> Gentamicin 5 - 7 mg/kg od iv
Pancreatitis	<b>Imipenem</b> 1 g tds iv
Gastroenteritis	Seek microbiology advice
Meningitis	<b>Ceftriaxone</b> 2 g bd iv (with Dexamethasone 10 mg qds) <b>AND (if pregnant, elderly or immunosuppressed)</b> <b>Amoxicillin</b> 2 g q4h iv
Cellulitis	<b>Flucloxacillin</b> 2 g qds iv <b>AND</b> <b>Benzylpenicillin</b> 2.4 g qds iv <b>AND (if rapidly spreading)</b> Clindamycin 1.2 g qds iv
Osteomyelitis	<b>Flucloxacillin</b> 2 g qds iv <b>AND</b> Fucidin 500 mg tds po
Prosthetic joint	Vancomycin iv as per <a href="#">chart</a>
ENT	<b>Co-amoxiclav</b> 1.2 g tds iv
Line / Foreign Body or IVDU	<b>Flucloxacillin</b> 2 g qds iv <b>AND (if ITU, tunnelled line, immunosuppressed)</b> Gentamicin 5 - 7 mg/kg od iv
Neutropenic	<b>Tazocin</b> 4.5g tds iv <b>AND</b> Gentamicin 5 mg/kg iv od <b>AND (if line sepsis)</b> Vancomycin iv as per <a href="#">chart</a> <b>ADD Metronidazole 500 mg q8h iv if clostridium difficile diarrhoea</b>



# Management: continued

- Cause
- Antibiotics
- Drain any abscesses
- Organ support
- Insulin
- Nutrition
- Pressure sores
- VTE



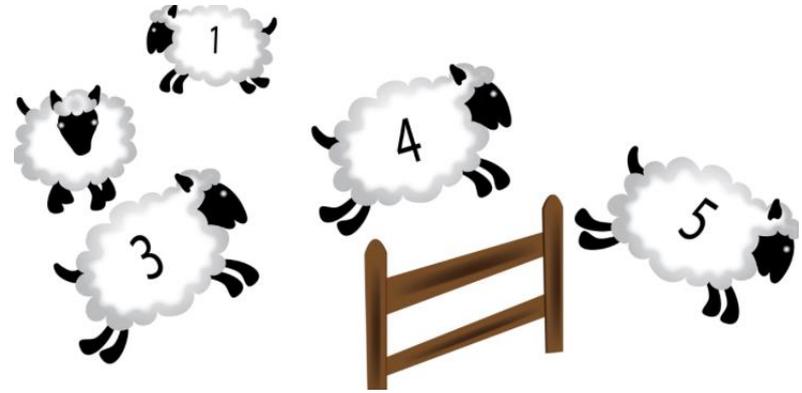
# EWS



NEWS KEY		NAME:		D.O.B.		ADMISSION DATE:		
0123								
DATE						DATE		
TIME						TIME		
RESP. RATE	≥25			3			≥25	
	21-24			2			21-24	
	12-20			1			12-20	
	9-11			1			9-11	
	≤8			3			≤8	
SpO <sub>2</sub>	≥96			1			≥96	
	94-95			2			94-95	
	92-93			3			92-93	
	≤91			2			≤91	
Inspired O <sub>2</sub> %	%			2			%	
TEMP	≥39°			2			≥39°	
	38°			1			38°	
	37°						37°	
	36°			1			36°	
	≤35°			3			≤35°	
NEW SCORE uses Systolic BP  BLOOD PRESSURE	230			3			230	
	220						220	
	210						210	
	200						200	
	190						190	
	180						180	
	170						170	
	160						160	
	150						150	
	140						140	
	130						130	
	120						120	
	110			1			110	
	100			2			100	
	90			3			90	
HEART RATE	≥140			3			≥140	
	130			2			130	
	120						120	
	110			1			110	
	100						100	
	90						90	
	80						80	
	70						70	
	60						60	
	50						50	
	40			1			40	
	30			3			30	
	Level of Consciousness	Alert V / P / U						Alert V / P / U
	BLOOD SUGAR							Blood Sugar
	TOTAL NEW SCORE							TOTAL SCORE

# EWS

- **0-1**: Continue current obs
- **2**: ↑ frequency of obs
- **3**: Doctor to review within 1 hour
- **4+**: Immediate review by doctor



# Escalation?



Who you gonna call?



- YOUR TEAM
- MEDICAL SPR ON-CALL
- CCOT/ITU
- CARDIAC ARREST CALL



**2222**

 **SIMPLY**  
*FINALS*

# SBAR

<b>S</b>	Date: ..... Time: ..... (24hrs) Drs name: ..... My name is ..... From Ward/Dept ..... I am calling about (patient name) ..... The problem is .....
<b>B</b>	The patient was admitted with ..... on ...../...../..... Relevant PMH ..... Resuscitation status .....
<b>A</b>	The patient has a PAR score of ..... Airway ..... Breathing ..... Circulation ..... Disability ..... Exposure ..... Other relevant factors e.g. Sepsis screening, blood results, pain, urine output .....
<b>R</b>	I request you review the patient within the next ..... hrs/mins (enter agreed timescale e.g. 30mins) Document any initial instructions ..... ..... Patient reviewed by Dr at ..... (24hrs)



# How to discuss with Microbiology

- Patient details
- **SAMP(L)E**
- Previous culture results/imaging + sensitivities
- Previous antibiotics and any missed doses
- Documentation
  
- SBAR



# Infection Control



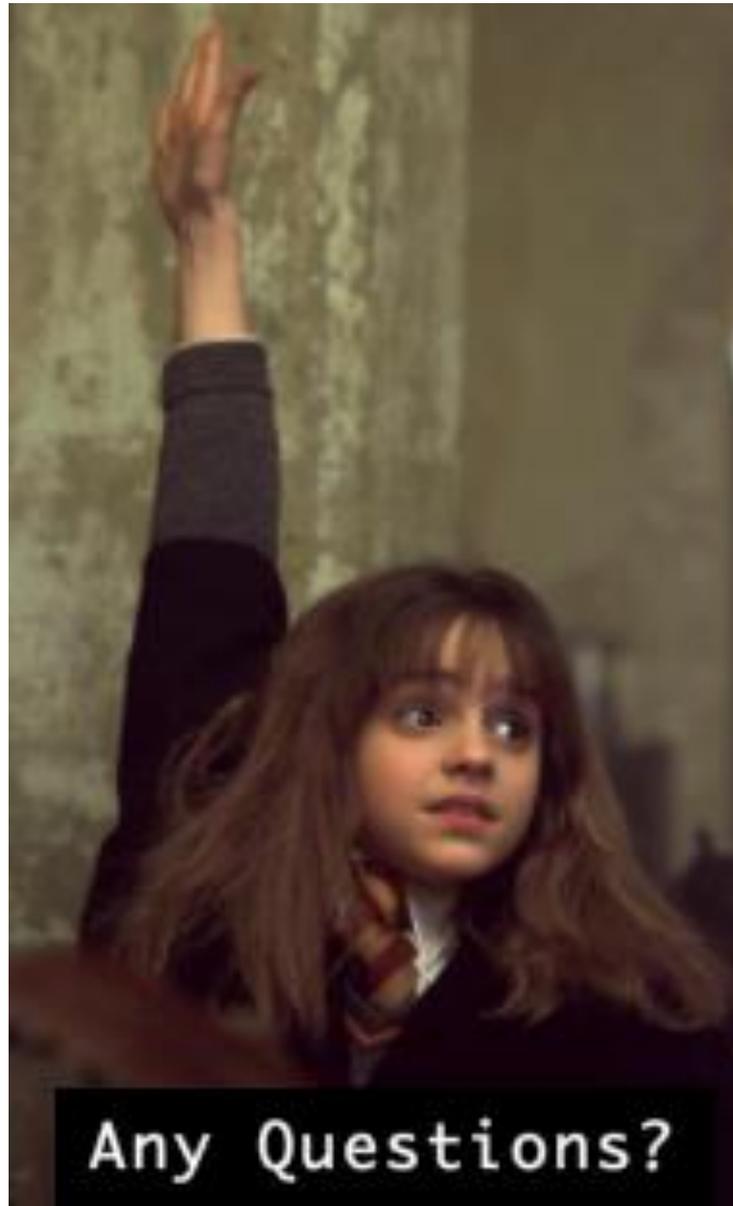
# Top tips

- 37 000 deaths a year
- WHAT! (2/4=SIRS)
- Infection + HAT= **Sepsis**.
- **Sepsis Six**: 3 out/ 3 in
- Don't be afraid to start **antibiotics**!
- **Escalate** to a Senior!



# Summary

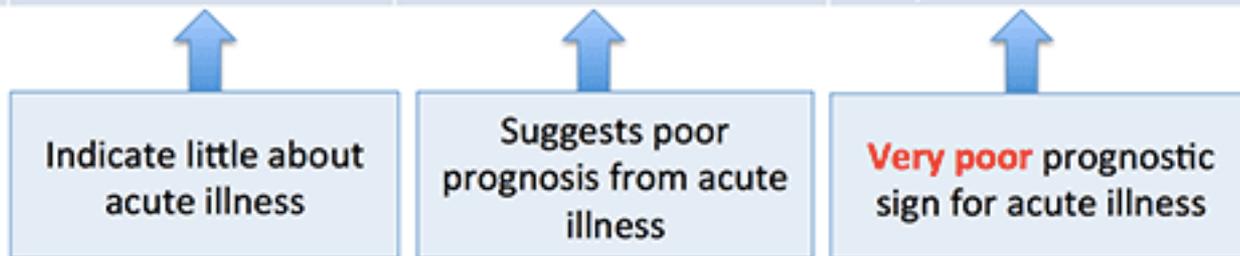
- Old/ New Definitions: **SIRS/Sepsis/Severe Sepsis/SHOCK** Vs **Sepsis/ SEPIC SHOCK**
- Recognition: **MAGIC** (**SAMPLE**)
- Investigations **Septic screen**
- Management: **SEPSIS 6** (3 in 3 out)
- EWS/SBAR
- Infection control



 **SIMPLY**  
*FINALS*

	OLD	NEW
<b>SEPSIS</b>	<p>SIRS</p> <p>+</p> <p>Suspected Infection</p>	<p>SUSPECTED/DOCUMENTED INFECTION</p> <p>+</p> <p>2 or 3 on qSOFA (HAT):  Hypotension (SBP ≤100 mmHg)  AMS (GCS ≤13)  Tachypnea (≥22/min)</p> <p>OR</p> <p>Rise in SOFA score by 2 or more</p>
<b>SEVERE SEPSIS</b>	<p>Sepsis</p> <p>+</p> <p>SBP &lt;90 mmHg or MAP &lt; 65 mmHg  lactate &gt; 2.0 mmol/L  INR &gt;1.5 or a PTT &gt;60 s  Bilirubin &gt;34 μmol/L  Urine output &lt;0.5 mL/kg/h for 2 h  Creatinine &gt;177 μmol/L  Platelets &lt;100 ×10<sup>9</sup>/L  SpO<sub>2</sub> &lt;90% on room air</p>	
<b>SEPTIC SHOCK</b>	<p>SEPSIS</p> <p>+</p> <p>HYPOTENSION</p> <p>after adequate fluid resuscitation</p>	<p>SEPSIS</p> <p>+</p> <p>VASOPRESSORS needed for MAP &gt;65 mmHg</p> <p>+</p> <p>LACTATE &gt;2 mmol/L  after adequate fluid resuscitation</p>

qSOFA criterion	Spurious abnormality	Primary abnormality	Secondary abnormality
SBP $\leq$ 100	- Low baseline Bp	- Spontaneous AF with RVR - Myocarditis - Type-1 MI	- Septic shock - Hemorrhage
Altered mentation	- Dementia - Received procedural sedation	- Sedative intoxication - Stroke - Encephalitis	- Shock (any type) - Hypoxemia - Hypercapnia
RR $\geq$ 22	- Anxiety - Pain	- Pneumonia - Asthma - COPD	- Resp compensation for metabolic acidosis - Septic shock



# Pathophysiology

↑ Immune modulators: **Cytokines** (IL 1b, 4, 6, 8, 10, TNF  $\alpha/\beta$ )

**Nitric oxide** → VASODILATION

- **Cardiovascular:** Tachycardia/Hypotension → Vasodilation and ↓ systemic vascular resistance
- **Respiratory:** Tachypnoea ARDS (↑ 'leakiness', alveolar oedema)
- **Renal:** Creatinine ↑ (vasodilation = hypoperfusion)
- **Blood:** activation of the extrinsic clotting cascade → DIC
- **Brain:** Hypoperfusion = confusion
- **Lactate:** produced in response to tissue hypoperfusion

