

Supplementary Table 1: Definition of Bacterial Infections

- a) spontaneous bacteremia: positive blood cultures without a source of infection,
- (b) SBP: ascitic fluid polymorphonuclear cells  $>250/\mu\text{L}$  with/without a positive fluid culture,
- (c) lower respiratory tract infections: new pulmonary infiltrate in the presence of: (i) at least one respiratory symptom (cough, sputum production, dyspnea, pleuritic pain) with (ii) at least one finding on auscultation (rales or crepitation) or one sign of infection (core body temperature  $>38^{\circ}\text{C}$  or  $< 36^{\circ}\text{C}$ , shivering or leucocyte count  $>10,000/\text{mm}^3$  or  $<4,000/\text{mm}^3$ ) in the absence of antibiotics,
- (d) Clostridium difficile: diarrhea with a positive C. difficile assay
- (e) bacterial entero-colitis: diarrhea or dysentery with a positive stool culture for Salmonella, Shigella, Yersinia, Campylobacter, or pathogenic E. coli,
- (f) skin Infection: fever with cellulitis,
- (g) urinary tract infection (UTI): urine WBC  $>15/\text{high power field}$  with either positive urine gram stain or culture in a symptomatic patient,
- (h) intra-abdominal infections: diverticulitis, appendicitis, cholangitis, etc.,
- (i) secondary bacterial peritonitis:  $>250$  polymorphonuclear cells/ $\mu\text{L}$  of ascitic fluid in the presence of an intra-abdominal source of peritonitis and multiple organisms cultured from ascitic fluid.

Supplementary Table 2: Definition of Fungal Infections according to [the Infectious Disease Society of America](#)

- (1) positive blood culture for yeast
- (2) Peritonitis: positive ascitic fluid culture for yeast and ascitic fluid cell count > 250 polymorphonuclear cells/UI , with or without an intraabdominal source of peritonitis.
- (3) UTI: urine culture growing >100,000 cfu/ml of yeast , with pyuria >15 polymorphonuclear leukocytes or positive leukocyte esterase in a symptomatic patient,
- (4) Any positive fluid culture for yeast from a normally sterile site, e.g., CSF, pleural fluid.
- (5) Oro-pharyngeal and invasive esophageal infection confirmed with brushings and biopsy
- (6) Invasive fungal infections of skin and soft-tissues

Supplementary Table 3: Fungal infection Rates by Reason for Admission

Reason for Admission	Number <sup>1</sup>	Fungal Infection Rate	95% Exact CI <sup>2</sup>
Infections	735	9%	(7%, 11%)
Not infected			
Liver Related			
GI Bleeding	451	3%	(2%, 6%)
HE without obvious infection	449	4%	(3%, 7%)
Renal dysfunction	293	9%	(6%, 12%)
Electrolyte abnormalities	106	6%	(2%, 12%)
Anasarca	276	6%	(3%, 9%)
Alcohol-related admission	133	5%	(2%, 10%)
Non-liver related			
Transplant Workup	161	9%	(5%, 15%)
Other	752	4%	(3%, 6%)
Non-Liver Related			
Other Non-Liver Related	702	5%	(3%, 8%)
Cardiac	60	2%	(0%, 9%)
Pulmonary	62	2%	(0%, 9%)
Psychiatric	4	0%	(0%, 60%)
Orthopedic	21	10%	(3%, 36%)

Notes: 1. Does not sum to 2,743 since individuals can have multiple reasons for admission listed

2. Clopper-Pearson confidence interval

Supplementary Table 4: Comparison between patients without infections, those with bacterial infections on admission, those with nosocomial bacterial infections and those with both.

	No Infection (n = 1691)	Admission Bacterial Infection Only (n = 590)	Nosocomial Bacterial Infections (n = 328)	Fungal Infection Only (n = 30)	Fungal Infection with a Bacterial Infection (n = 104)	p-value
Age (years)	57.43 (10.59)	56.75 (11.37)	57.87 (10.82)	58.40 (12.72)	54.87 (11.46)	0.26
Gender (Male)	64%	61%	56%	50%	50%	0.005
Race (Caucasian)	80%	77%	78%	83%	84%	0.50
BMI	29.41 (8.86)	29.53 (8.07)	29.53 (7.13)	31.90 (8.85)	30.07 (8.64)	0.40
Etiology						0.03
Alcoholic cirrhosis	31%	29%	32%	24%	32%	
HCV	21%	21%	19%	34%	13%	
HCV + alcoholic	14%	14%	13%	7%	10%	
NASH	22%	19%	24%	24%	23%	
Other	12%	17%	12%	10%	22%	
Diabetes	33%	31%	38%	43%	48%	0.006
Admitted with infection	-	100%	24%	0%	63%	<0.0001
Ascites	68%	73%	75%	73%	77%	0.008
Refractory ascites	30%	35%	40%	40%	42%	0.0003
Hospitalized within 6 months	65%)	70%	70%	77%	78%	0.008
Medication used:						
PPI	53%	55%	61%	66%	59%	0.10
NSBB	40%	42%	38%	48%	35%	0.52
SBP prophylaxis	16%	19%	24%	29%	26%	0.0006
Rifaximin	34%	39%	40%	17%	40%	0.02
Lactulose	52%	58%	63%	62%	59%	0.002
Admission labs						
Bilirubin	5.68 (8.43)	6.08 (7.420)	6.06 (7.53)	9.94 (25.12)	9.40 (10.29)	<0.0001

Albumin	2.90 (0.65)	2.73 (0.71)	2.77 (0.70)	2.91 (0.65)	2.72 (0.69)	<0.0001
WBC	7.09 (4.57)	9.09 (7.11)	8.14 (4.91)	7.99 (5.27)	9.47 (6.21)	<0.0001
Serum sodium	134.57 (6.87)	133.54 (7.93)	133.70 (6.10)	134.70 (6.65)	132.72 (6.37)	<0.0001
Serum creatinine	1.48 (1.30)	1.57 (1.36)	1.74 (1.40)	1.75 (1.13)	2.05 (1.91)	<0.0001
Child-Pugh score	9.30 (2.13)	9.97 (2.13)	10.13 (2.17)	9.56 (1.85)	10.63 (1.93)	<0.0001
MELD score	18.63 (7.42)	20.44 (7.73)	20.99 (8.09)	21.14 (7.09)	23.91 (8.30)	<0.0001
SIRS	21%	35%	37%	29%	37%	<0.0001
Outcomes						
Length of hospital stay	9.13 (10.15)	11.55 (10.41)	21.39 (19.78)	23.31 (21.96)	40.06 (119.38)	<0.0001
ICU admission	17%	24%	41%	45%	64%	<0.0001
Renal Failure	5%	6%	14%	20%	35%	<0.0001
Brain Failure	12%	16%	20%	25%	39%	<0.0001
Circulatory Failure	6%	10%	16%	17%	34%	<0.0001
Respiratory Failure	9%	12%	24%	33%	40%	<0.0001
# Organ Failures						<0.0001
0	77%	71%	59%	47%	38%	
1	17%	18%	21%	27%	14%	
2	4%	7%	10%	17%	20%	
3	1%	3%	9%	7%	18%	
4	0%	1%	2%	3%	9%	
NACSELD-ACLF	6%	11%	20%	27%	47%	<0.0001
30 day survival	93%	89%	78%	73%	64%	<0.0001

Supplementary Table 5: Bacterial compared to specific fungal infections

	<b>Bacterial Infection Only (n = 918)</b>	<b>Potentially Invasive Fungal Infection (n = 82)</b>	<b>Other Fungal Infection (n = 52)</b>	<b>p-value</b>
Age (years)	57.15 (11.18)	57.10 (9.11)	53.38 (14.92)	0.14
Gender (Male)	59%	49%	53%	0.13
Race (Caucasian)	77%	89%	75%	0.04
Etiology				0.43
Alcoholic cirrhosis	30%	33%	25%	
HCV	20%	17%	20%	
HCV + alcoholic cirrhosis	14%	12%	4%	
NASH	21%	21%	27%	
Other	15%	17%	24%	
Diabetes	34%	51%	39%	0.007
Admitted with bacterial infection	73%	46%	52%	<0.0001
Ascites	74%	80%	69%	0.29
Refractory ascites	37%	50%	29%	0.03
Hospitalized in last 6 months	70%	84%	68%	0.05
Admission Medications:				
Proton Pump Inhibitors	57%	59%	63%	0.68
Non-selective beta-blockers	40%	43%	31%	0.36
SBP prophylaxis	21%	27%	26%	0.38
Rifaximin	39%	39%	29%	0.32
Lactulose	60%	62%	55%	0.73
Admission Laboratory values				
Bilirubin (mg/dl)	6.07 (7.46)	8.81 (9.87)	10.71	0.04

			(20.91)	
Albumin (gm/dl)	2.75 (0.71)	2.81 (0.64)	2.70 (0.75)	0.35
WBC (1000/ml)	8.75 (6.43)	9.17 (6.19)	9.09 (5.81)	0.80
Serum Na (meq/L)	133.60 (7.33)	133.01 (6.68)	133.40 (6.18)	0.43
Serum creatinine (mg/dl)	1.63 (1.38)	2.32 (1.99)	1.45 (1.20)	<0.0001
Child-Pugh score	10.03 (2.15)	10.66 (1.95)	10.00 (1.92)	0.08
MELD score	20.64 (7.86)	24.96 (8.27)	20.53 (7.070)	<0.0001
SIRS (n, %)	36%	30%	43%	0.31
Inpatient course				
Length of hospital stay (total)	15.06 (15.21)	30.81 (25.42)	45.22 (169.12)	<0.0001
AKI episode (%)	53%	78%	67%	<0.0001
ICU admission	30%	73%	39%	<0.0001
Renal Failure	9%	43%	13%	<0.0001
Brain Failure	17%	47%	17%	<0.0001
Circulatory Failure	13%	42%	12%	<0.0001
Respiratory Failure	17%	45%	29%	<0.0001
Total Organ Failures	0.54 (0.91)	1.73 (1.37)	0.69 (1.02)	<0.0001
Number of Organ Failures				<0.0001
0	67%	26%	63%	
1	19%	22%	10%	
2	8%	17%	23%	
3	5%	24%	2%	
4	1%	11%	2%	
NACSELD-ACLF	14%	52%	27%	<0.0001
30 day survival	85%	62%	73%	<0.0001

