

Table 1: Demographic characteristics of 385 adults with infection and high-risk clinical findings presenting to Waikato Hospital, a tertiary centre in New Zealand, before and after a sepsis quality programme introduced in 2018.

	Total	Group 1: pre-implementation	Group 2: post-implementation	Group 3: maintenance	p-value (Group 1 vs Group 2+3)
	N=385	N=117	N=149	N=119	
Mean age (SD)	67 (18)	69 (19)	67 (18)	65 (18)	0.23
Mean age Māori/Pasifika	58 (16)	60 (18)	60 (15)	52 (15)	0.50
Age ≥75	161 (42%)	58 (50%)	61 (41%)	42 (35%)	0.05
Male gender	225 (58%)	71 (61%)	91 (61%)	63 (53%)	0.56
Ethnicity					0.52
Asian	13 (3%)	6 (5%)	3 (2%)	4 (3%)	
NZ European	253 (66%)	78 (67%)	97 (65%)	78 (66%)	
NZ Māori	103 (27%)	27 (23%)	45 (30%)	31 (26%)	
Pasifika	7 (2%)	2 (2%)	3 (2%)	2 (2%)	
Other	9 (2%)	4 (3%)	1 (1%)	4 (3%)	
Median Charlson Comorbidity Index (IQR)	1 (0–3)	1 (0–3)	1 (0–2)	1 (0–3)	0.63
Missing	6	3	3	0	
30-day mortality	87 (23%)	29 (25%)	33 (22%)	25 (21%)	

ICU = intensive care unit; HDU = high dependency unit; IQR = interquartile range

Table 2: Infection-related characteristics of 385 adults with infection and high-risk clinical findings presenting to Waikato Hospital, a tertiary centre in New Zealand, before and after a sepsis quality programme introduced in 2018.

	Total	Group 1: pre-implementation	Group 2: post-implementation	Group 3: maintenance	p-value (Group 1 vs Group 2+3)
	N=385	N=117	N=149	N=119	
Arrival by ambulance	285 (74%)	89 (76%)	111 (74%)	85 (72%)	0.55
Final diagnosis					0.098
Pneumonia	93 (24%)	22 (19%)	48 (32%)	23 (19%)	
Urinary tract infection	91 (24%)	32 (27%)	26 (17%)	33 (28%)	
Intra-abdominal infection	46 (12%)	14 (12%)	17 (11%)	15 (13%)	
Skin, soft tissue, bone and joint infection	63 (16%)	26 (22%)	21 (14%)	16 (13%)	
Meningitis/CNS infection	3 (1%)	0 (0%)	1 (1%)	2 (2%)	
Device-related infection	5 (1%)	1 (1%)	4 (3%)	0 (0%)	
Endovascular infection	11 (3%)	1 (1%)	9 (6%)	1 (1%)	
Source unclear	52 (14%)	18 (15%)	16 (11%)	18 (15%)	
Other	21 (5%)	3 (3%)	7 (5%)	11 (9%)	
Under emergency medicine at T0	311 (81%)	101 (86%)	120 (81%)	90 (76%)	0.11
Median number of red flags (IQR)	2 (1-3)	2 (1-4)	2 (1-3)	2 (1-3)	0.11
Presence of haemodynamic instability (SBP<90 or lactate>4)	141 (37%)	63 (54%)	60 (40%)	18 (15%)	<0.001
Red flags					
Responds only to voice or pain/unresponsive	60 (16%)	12 (10%)	28 (19%)	20 (17%)	0.15
Systolic BP ≤90mmHg	124 (32%)	51 (44%)	47 (32%)	26 (22%)	0.002
Heart rate >130 per minute	79 (21%)	21 (18%)	35 (23%)	23 (19%)	0.50
Respiratory rate ≥25 per minute	194 (50%)	59 (50%)	87 (58%)	48 (40%)	0.013
Needs oxygen to keep SpO2 ≥92%	159 (41%)	51 (44%)	70 (47%)	38 (32%)	0.04

Table 2 (continued): Infection-related characteristics of 385 adults with infection and high-risk clinical findings presenting to Waikato Hospital, a tertiary centre in New Zealand, before and after a sepsis quality programme introduced in 2018.

Non-blanching rash, mottled/ashen/cyanotic	56 (15%)	21 (18%)	21 (14%)	14 (12%)	0.40
Not passed urine in last 18 hours UO <0.5 ml/kg/hr	24 (6%)	7 (6%)	12 (8%)	5 (4%)	0.43
Lactate ≥2mmol/l	200 (52%)	68 (58%)	59 (40%)	73 (61%)	<0.001
Recent chemotherapy	29 (8%)	7 (6%)	11 (7%)	11 (9%)	0.63
Placement after diagnosis of sepsis					0.21
General ward	250 (65%)	81 (69%)	96 (64%)	73 (61%)	
HDU	88 (23%)	28 (24%)	32 (21%)	28 (24%)	
ICU	42 (11%)	7 (6%)	18 (12%)	17 (14%)	
Mortuary	5 (1%)	1 (1%)	3 (2%)	1 (1%)	

T0= time zero; IQR = interquartile range; BP = blood pressure; SpO2 = oxygen saturation; UO = urine output; HDU = high dependency unit; ICU = intensive care unit

Table 3: Adjusted odds of sepsis resuscitation bundle delivery within 3 hours among 385 patients with infection and high-risk clinical findings, based on key demographic and clinical variables in Waikato Hospital from 2018 to 2021.

	Adjusted odds ratio	95% confidence interval	p-value
Māori or Pasifika ethnicity	0.71	0.43–1.17	0.18
Under emergency medicine	3.33	1.85–5.98	<0.001*
Age group (for every increase of 10 years)	0.83	0.73–0.95	0.005*
Haemodynamic instability (SBP <90mmHg or lactate >4)	1.33	0.79–2.23	0.29
Arrival by ambulance	1.60	0.94–2.72	0.08
Three or more red flags	1.59	0.97–2.61	0.07
Final diagnosis	1.01	0.93–1.11	0.76

SBP = systolic blood pressure

Table 4: Odds of sepsis resuscitation bundle delivery within 3 hours, before and after the introduction of the Raise the Flag sepsis quality programme, in 385 patients with infection and high-risk clinical findings presenting to Waikato Hospital, New Zealand from 2018 to 2021.

Sepsis bundle completion within 3 hours			
	Yes	No	Total
Group 1: pre-implementation	58 (49.6%)	59 (50.4%)	117
Group 2: post-implementation	95 (63.8%)	54 (36.2%)	149
Group 3: maintenance	58 (48.7%)	61 (51.3%)	119
Unadjusted analysis			
	OR	95% CI	p-value
Group 2 vs Group1	1.79	1.09–2.95	0.02*
Group 3 vs Group1	1.07	0.64–1.78	0.80
Multivariate analysis*			
	OR	95% CI	p-value
Group 2 vs Group1*	2.20	1.27–3.79	0.005*
Group 3 vs Group 1*	1.22	0.89–1.66	0.21

OR = odds ratio; CI = confidence interval

*Adjusted for care under emergency department at time zero, 10-year age group, final diagnosis, ethnicity, haemodynamic instability (lactate ≥ 4 or systolic blood pressure < 90 mmHg), arrival by ambulance and three or more red flags.