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3 **Appendix 1: Vignette Template**
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5 Participant Code: Gender: Female Male

6 Year of Residency: Hospital:

7 **Introduction:** Below you will find a series of mock cases of orthopedic trauma. Every case
 8 requires open reduction and internal fixation. Please indicate which analgesic you would
 9 prescribe for the patient’s pain if you were treating this patient at discharge or in your usual
 10 practice setting(s). In addition, indicate the dose, frequency, and duration of the medication. You
 11 may choose more than one medication.

12 **Note: None of the patients have ever taken opioid medications.**

13 **Case 1:** An otherwise healthy 26 year old male presents with right ankle pain after a soccer
 14 injury. Radiographs reveal a bimalleolar ankle fracture. Open reduction internal fixation is
 15 performed.
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	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

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22 **Case 2:** An otherwise healthy 73 year old female is struck by a bus and is brought to the ED. She
 23 is found to have a right midshaft femoral shaft fracture. Within 24 hours, open reduction internal
 24 fixation was performed with an intramedullary nail.

	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			

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<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

27 **Case 3:** An otherwise healthy 22 year old female presents with right wrist pain and deformity
 28 after an accident at work. Radiographs demonstrated a displaced distal radius fracture. She was
 29 treated with open reduction internal fixation using a volar locking plate.



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	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

35 **Case 4:** An otherwise healthy 32 year old male complains of severe right leg pain after a motor
 36 vehicle collision. Standard AP and lateral radiographs were taken and the patient was diagnosed
 37 with a tibial shaft fracture. Open reduction internal fixation was performed with an
 38 intramedullary nail.

	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			

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<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

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Case 5: An otherwise healthy 82 year old male is struck by a car and presents with right knee pain. Standard AP and lateral knee radiographs were taken. The patient is diagnosed with a right tibial plateau fracture. Open reduction internal fixation is performed.



	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

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Case 6: An otherwise healthy 77 year old male presents with right ankle pain after a fall. A right bimalleolar ankle fracture is found on X-ray. Open reduction internal fixation is performed.

	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			

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<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

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Case 7: An otherwise healthy 37 year old female is brought to the ED after a motor vehicle collision. She is found to have a right midshaft femoral shaft fracture. Open reduction internal fixation was performed with an intramedullary nail within 24 hours of presentation.



	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

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Case 8: An otherwise healthy 79 year old female fell on her outstretched hand and presents with right wrist pain and deformity. Radiographs demonstrated a displaced distal radius fracture. She was treated with open reduction internal fixation using a volar locking plate.

	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			

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|--|--|--|--|
| <input type="checkbox"/> tramadol | | | |
| <input type="checkbox"/> no medication | | | |

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68 **Case 9:** An otherwise healthy 80 year old male is struck by a motorcycle and complains of
 69 severe left leg pain. Standard AP and lateral radiographs reveal a tibial shaft fracture. Open
 70 reduction internal fixation was performed with an intramedullary nail.



	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			
<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

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77 **Case 10:** An otherwise healthy 41 year old male presents with left knee pain after being struck
 78 by a motorcycle. Standard AP and lateral knee radiographs were taken and the patient was
 79 diagnosed with a left tibial plateau fracture. Open reduction internal fixation was performed.

	Dose:	Frequency:	Duration:
<input type="checkbox"/> codeine			
<input type="checkbox"/> diclofenac			
<input type="checkbox"/> hydromorphone			
<input type="checkbox"/> oxycodone			

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<input type="checkbox"/> paracetamol (acetaminophen)			
<input type="checkbox"/> tramadol			
<input type="checkbox"/> no medication			

Do you feel the pain medication prescribed above is generally adequate for these patients?

- Yes
- No

Appendix 2: Bivariate Analyses of Morphine Milligram Equivalents (MMEs) Prescribed per day, and Duration of Opioid Prescription

	MME/day				Duration (days)			
	Mean (SD)	Lower	Upper	p-value	Mean (SD)	Lower	Upper	p-value
Country				<.0001				<.0001
US	46 (4)	39	53		9.5 (0.6)	8.3	10.7	
Netherlands	27 (3)	21	33		6.7 (0.8)	5.1	8.4	
Haiti	14 (3)	8	19		3.7 (1)	1.8	5.6	
Sex				0.0001				0.5923
Female	32 (4)	25	39		7.3 (1.1)	5.2	9.5	
Male	37 (3)	31	43		8 (0.5)	6.9	9.1	
Training year				0.0001				0.0286
1	36 (9)	19	52		8.2 (1.2)	5.8	10.5	
2	39 (7)	27	52		9.7 (1.1)	7.6	11.9	
3	31 (4)	24	38		5.8 (0.7)	4.6	7.1	
4	34 (6)	23	46		7.7 (1.6)	4.7	10.8	
5+	49 (6)	38	60		10.1 (1.4)	7.3	12.9	
Age				0.0001				0.0536
<40	39 (3)	34	45		7.7 (0.5)	6.7	8.7	
>70	32 (3)	27	37		8.1 (0.5)	7.1	9.1	
Injury site				0.0001				<.0001
Ankle	33 (4)	26	40		7.4 (0.5)	6.4	8.4	
Femur	41 (3)	35	46		8.5 (0.5)	7.5	9.6	
Wrist	25 (2)	21	30		5.9 (0.4)	5.1	6.8	
Tibial shaft	41 (3)	35	47		8.8 (0.6)	7.7	9.9	

Tibial Plateau	41 (3)	34	47		8.9 (0.6)	7.8	10.0	
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Appendix 3: Odds Ratios of Likelihood of Prescribing Opioids

	OR of prescribing opiates (95% CI)	p-value
	N (%)	
Country		
Netherlands	0.02 (0.01,0.07)	<.0001
Haiti	0.0044 (0.0012, 0.0162)	<.0001
US	-	
Sex		
Female	0.66 (0.28,1.57)	0.3465
Male	-	
Training year		
2	0.398 (0.075,2.105)	0.2785
3	1.382 (0.42,4.542)	0.5945
4+	0.508 (0.11,2.338)	0.3846
1	-	
Age		
<40	1.25 (0.93,1.68)	0.1444
>70	-	
Injury site		
Femur	1.66 (1.14,2.40)	0.0076
Tibial Plateau	1.91 (1.18,3.09)	0.0080
Tibial shaft	2.02 (1.26,3.24)	0.0035
Wrist	0.78 (0.608,1.002)	0.0516
Ankle	-	

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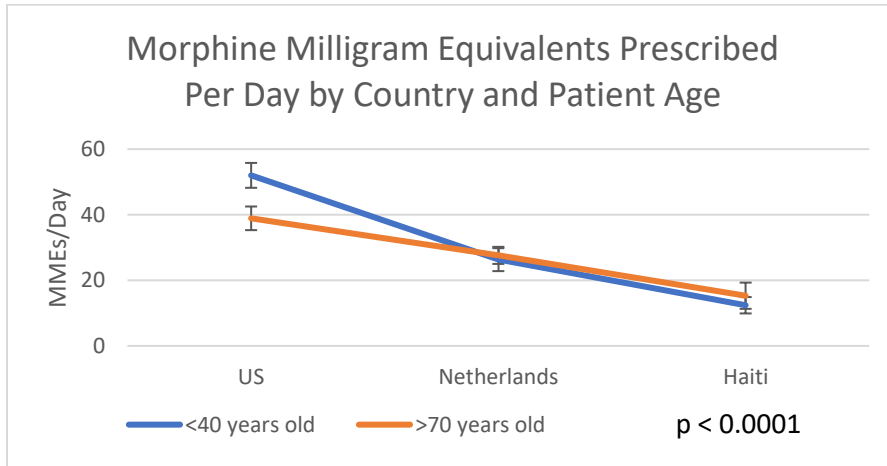
A CROSS-CULTURAL COMPARISON OF POSTOPERATIVE DISCHARGE OPIOID PRESCRIBING AFTER ORTHOPAEDIC TRAUMA SURGERY

<http://dx.doi.org/10.2106/JBJS.18.01022>

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Appendix 4: Opioid Prescription Stratified by Country and Patient Age for MME/day and Duration

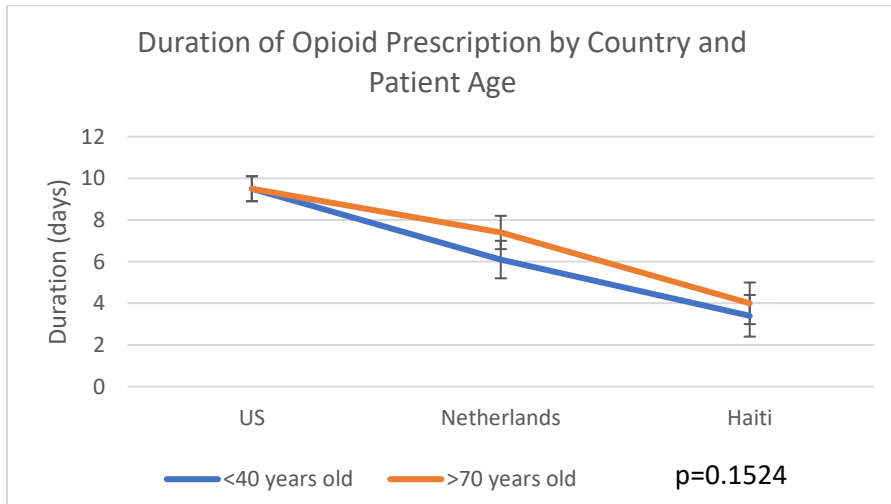
Figure 1:



The error bars indicate standard deviation

Appendix 4: Opioid Prescription Stratified by Country and Patient Age for MME/day and Duration

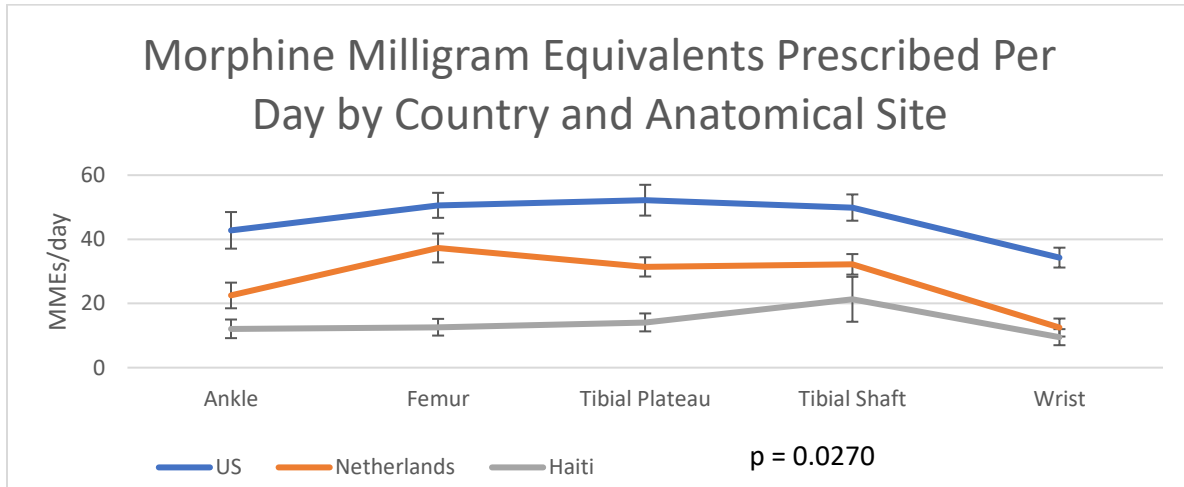
Figure 2:



The error bars indicate standard deviation

Appendix 5: Opioid Prescription Stratified by Country and Anatomical Site for MME/day and Duration

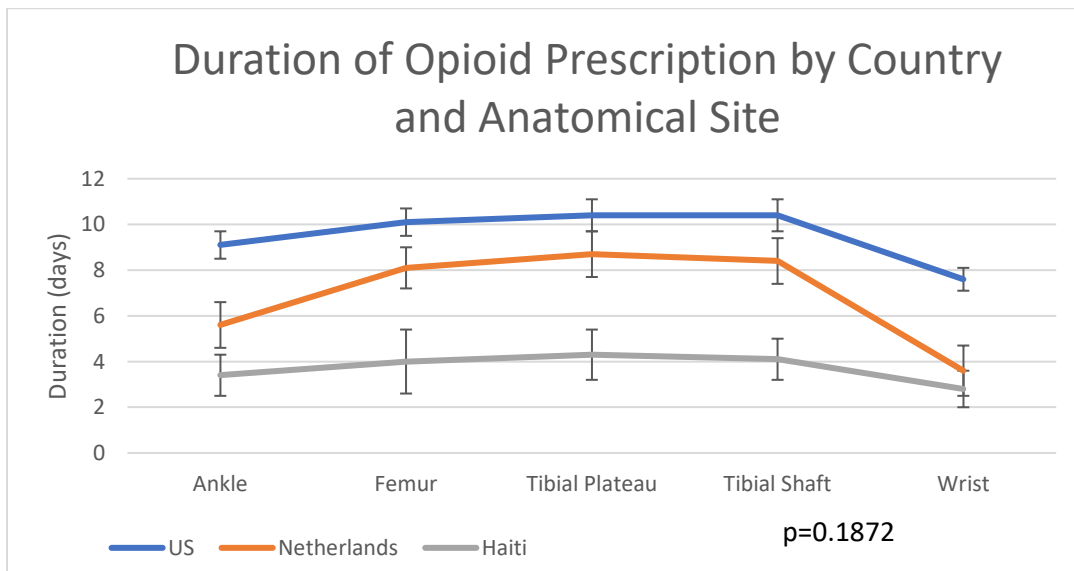
Figure 1:



The error bars indicate standard deviation

Appendix 5: Opioid Prescription Stratified by Country and Anatomical Site for MME/day and Duration

Figure 2:



The error bars indicate standard deviation

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Appendix 6: Least Square Means for MME/day, Opioid Prescription Duration, and Likelihood of Opioid Prescriptions from the Multivariable Model with Generalized Estimation Equations

a) MME/day

Interaction effects	MME/day Estimate (95% CI)	P-value
Patient Age*Country		<.0001
>70 years old*Haiti	15 (8, 23)	
>70 years old*Netherlands	27 (22, 33)	
>70 years old*US	39 (32, 46)	
<40 years old*Haiti	13 (8, 17)	
<40 years old*Netherlands	27 (21, 33)	
<40 years old*US	52 (45, 60)	
Country*Injury Site		0.0249
Haiti*Ankle	12 (7, 18)	
Haiti*Femur	13 (8, 18)	
Haiti*Tibial Plateau	14 (9, 20)	
Haiti*Tibial Shaft	21 (8, 35)	
Haiti*Wrist	9 (5, 14)	
Netherlands*Ankle	22 (15, 30)	
Netherlands*Femur	37 (28, 46)	
Netherlands*Tibial Plateau	31 (25, 37)	
Netherlands*Tibial Shaft	32 (26, 38)	
Netherlands*Wrist	13 (7, 18)	
US*Ankle	42 (31, 53)	
US*Femur	51 (43, 58)	
US*Tibial Plateau	52 (43, 61)	

Interaction effects	MME/day Estimate (95% CI)	P-value
US*Tibial Shaft	49 (41, 57)	
US*Wrist	34 (28, 40)	

b) Duration

Main effects	Duration Estimate, in days (95% CI)	P-value
Injury Site		<.0001
Ankle	6.1 (5.2, 7.1)	
Femur	7.3 (6.2, 8.4)	
Tibial Plateau	7.7 (6.6, 8.8)	
Tibial Shaft	7.6 (6.6, 8.6)	
Wrist	4.7 (3.8, 5.6)	
Country		<.0001
Haiti	3.7 (1.8, 5.6)	
Netherlands	6.8 (5.1, 8.5)	
US	9.5 (8.4, 10.7)	

c) Likelihood of opioid prescription

Main effects	Estimate (95% CI)	P-value
Injury Site		0.0037
Ankle	1.711 (1.107, 2.316)	
Femur	2.482 (1.981, 2.984)	
Tibial Plateau	2.668 (2.093, 3.244)	
Tibial Shaft	2.742 (2.144, 3.341)	
Wrist	1.283 (0.705, 1.861)	
Country		<.0001

Main effects	Estimate (95% CI)	P-value
Haiti	-0.117 (-0.829, 0.596)	
Netherlands	1.409 (0.902, 1.915)	
US	5.240 (4.092, 6.388)	