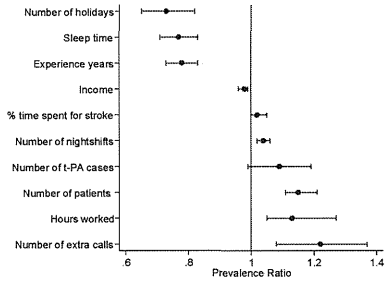
脳卒中診療医の勤務状況と疲労度調査
（平成23年5月）

- 目的：脳卒中治療に携わる医師のQuality of Life (QOL)、燃え尽き症候群の頻度を測定
- 対象：日本脳神経外科学会専門医、日本神経学会専門医 10,741名（震災の影響を考慮し、東北3県を除く全国調査）
- 方法：アンケート調査により、脳卒中治療に携わる医師のQOL、燃え尽き症候群の頻度を測定
- 疲弊度の測定
  - 燃え尽き症候群：日本版 MBI-GS を使用
  - QOL測定：SF-8（SF-36の短縮版）+ MHI-5
- 背景因子
  労働時間、睡眠時間、施設要因など合わせて評価

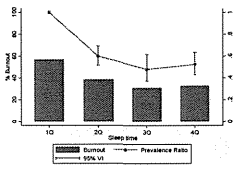
Age- and sex-adjusted predictors of Burnout



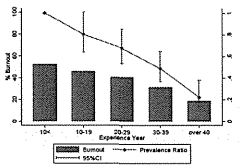
Predictors for burnout at 95% confidence intervals

Relationship between Burnout and Strong predictors
(Predictors for burnout at 95% confidence intervals)

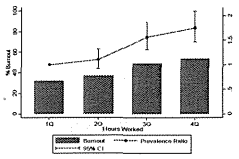
Sleep Duration



Experience Year



Hours Worked



- 危険因子とBurnoutとの間に定量的関係
- Sleep duration: OR 0.77 / hr
- Experience yr : OR 0.75 / yr
- Hours worked: OR 1.25

脳卒中患者の退院調査
—DPC, 電子レセプト情報の活用—
（平成23年、24年）

- 目的：脳卒中治療の大規模データベースの作成と、ベンチマーキングの可能性
- 対象：日本脳神経外科学会、日本神経学会教育訓練施設の中で、脳卒中診療施設調査に参加した 749病院
- 方法：前年度に治療した脳卒中症例を、ICD 10 codeで抽出
- 臨床指標の測定
  - アウトカム指標 （入院死亡率）、プロセス指標 など
- 診療施設調査データ （CSC Score）とアウトカムと関係
- 背景因子
  - 年齢、性、重症度、病院など合わせて評価
  - Hierarchical regression analysis

Demographics (脳卒中緊急入院 256病院 53,170例)

	Total	Ischemic stroke	Intracerebral hemorrhage	Subarachnoid hemorrhage
	(n=53,170)	(n=32,671)	(n=15,699)	(n=4,934)
Male, n (%)	29,353 (55.2)	18,816 (57.6)	9,030 (57.5)	1,584 (32.1)
Age, yr mean ± SD	72.5 ± 13.1	74.4 ± 12.2	70.7 ± 13.5	64.7 ± 14.8
Hypertension, n (%)	39,918 (75.1)	22,531 (69.0)	13,281 (84.6)	4,229 (85.7)
Diabetes Mellitus, n (%)	13,725 (25.8)	9,318 (28.5)	3,278 (20.9)	1,174 (23.8)
Hyperlipidemia, n (%)	15,015 (28.2)	11,104 (34.0)	2,529 (16.1)	1,412 (28.6)
Smoking (n=4,4842)	12,761 (24.0)	8,188 (25.1)	3,540 (22.5)	1,074 (21.8)
Japan Coma Scale				
0, n (%)	19,635 (36.9)	15,027 (46.0)	3,620 (23.1)	1,024 (20.8)
1-digit code, n (%)	19,371 (36.4)	12,375 (37.9)	5,934 (37.8)	1,117 (22.6)
2-digit code, n (%)	6,937 (13.0)	3,396 (10.4)	2,705 (17.2)	852 (17.3)
3-digit code, n (%)	7,227 (13.6)	1,873 (5.7)	3,440 (21.9)	1,941 (39.3)
Emergency admission by ambulance, n (%)	31,995 (60.2)	17,336 (53.1)	10,909 (69.5)	3,830 (77.6)

Demographics (脳卒中緊急入院 53,170例)

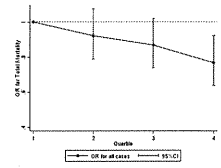
	Total	Ischemic stroke	Intracerebral hemorrhage	Subarachnoid hemorrhage
	(n=53,170)	(n=32,671)	(n=15,699)	(n=4,934)
Hospital characteristics (CSC scores)				
Total score (25 items)		16.4 ± 3.7	16.6 ± 3.4	16.8 ± 3.2
Personnel with expertise (7 items)		3.7 ± 1.2	3.7 ± 1.2	3.8 ± 1.2
Diagnostic techniques (6 items)		4.4 ± 1.1	4.5 ± 1.0	4.5 ± 1.0
Surgical/interventional Tx (5 items)		4.4 ± 1.1	4.4 ± 1.0	4.5 ± 0.9
Infrastructure (5 items)		2.6 ± 1.1	2.6 ± 1.1	2.7 ± 1.1
Education/research (2 items)		1.4 ± 0.8	1.4 ± 0.8	1.4 ± 0.8

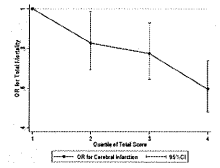
*病型による入院病院のCSC scoreには有意差なし

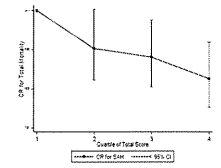
CSC Scoreの院内死亡への影響
(脳梗塞 緊急入院 32,671例)

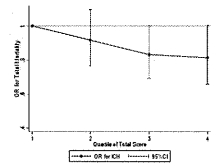
Cerebral Infarction		(adjusted by age, gender, and JCS)			
Factor	β	SE	OR	95%CI	P value
Male	0.2	0.05	1.23	1.12 – 1.35	<0.001
Age	0.34	0.02	1.4	1.34 – 1.47	<0.001
CSC total score	-0.03	0.01	0.97	0.96 – 0.99	0.001
JCS					
normal			1		
one-digit code	0.88	0.07	2.4	2.11 - 2.74	<0.001
two-digit code	2.01	0.07	7.46	6.47 - 8.60	<0.001
three-digit code	3.07	0.07	21.62	18.68 - 25.02	<0.001

院内総死亡に対するCSC Scoreの影響


全病型


脳梗塞

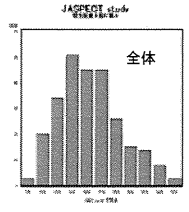

くも膜下出血

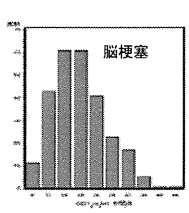

脳内出血

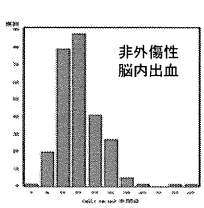
J-ACCESS Study
—GISの活用— （平成23年、24年）

- 目的:脳卒中治療の大規模データベースを活用し、施設の脳卒中診療能力と、実効医療圏のサイズがアウトカムに与える影響を検証
- 対象:
  - 退院調査に参加した施設の脳卒中症例
  - 患者自宅と病院の郵便番号から、GISを用いて運転時間を計算
  - 運転時間の中央値で、実効医療圏を分類
  - CSC Scoreの中央値で、施設の脳卒中診療能力を分類
- アウトカム
  - 入院死亡率
- 背景因子
  - 年齢、性、重症度、病院など合わせて評価
  - Hierarchical regression analysis

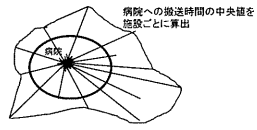
実効医療圏 (Catchment Area)

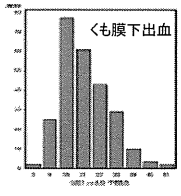






全病院の中央値
＝19.3分





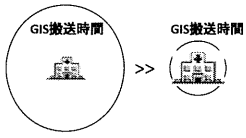
Hierarchical logistic regression analysis

脳梗塞	OR	95%CI	P value
Sex	1.20	1.07-1.34	0.001
Age (10y)	1.34	1.27-1.42	<0.001
CSC score	0.97	0.95-0.99	<0.001
範囲大小	1.16	1.00-1.35	0.044
JCS4分類	2.56	2.43-2.71	<0.001

脳内出血	OR	95%CI	P value
Sex	1.73	1.52-1.96	0.001
Age (10y)	1.34	1.28-1.41	<0.001
CSC score	0.96	0.93-0.98	<0.001
範囲大小	1.16	0.98-1.37	0.088
JCS4分類	6.33	5.80-6.91	<0.001
病床数大小	1.10	1.00-1.22	0.042

くも膜下出血	OR	95%CI	P value
Sex	1.46	1.19-1.79	0.001
Age (10y)	1.37	1.29-1.46	<0.001
CSC score	0.94	0.91-0.97	<0.001
範囲大小	1.05	0.84-1.32	0.645
JCS4分類	5.09	4.36-5.81	<0.001

脳卒中入院死亡率



* 脳梗塞では、Catchment Areaが大きいほど、死亡率が高い

平成24年度
J-ASPECT Study 退院患者調査
臨床指標速報値

2013年1月29日

24

データ対象病院

上段：H23年度
下段：H22年度
（データ年度）

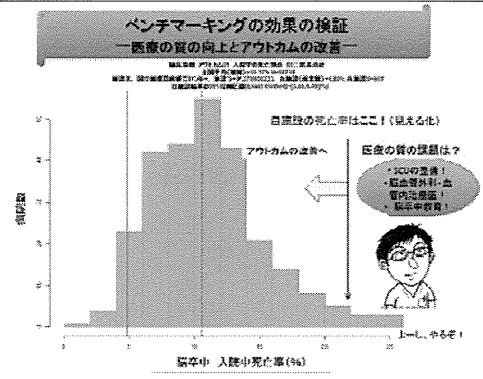
速報値は、1月25日時点までに事務局に到着したデータのうち、データに不備がなかったDPCの入院データのみが対象になります。

調査対象	参加意向 返事		構成比
757	返事有り	360	48%
		407	54%
	参加	344	45%
		322	43%
	不参加	16	2%
		85	11%
	返事無し	397	52%
		350	46%

	参加意向	1/25時点データインポート完了	提出率	臨床指標 速報集計 使用
合　計	344	**299**	87%	**275病院** **約8万9千症例**
	322	280	87%	258病院 約6万5千症例
DPC対象病院	299	262	88%	262
	282	254	90%	244
DPC準備病院	16	13	81%	13
	20	14	70%	14
DPC調査不参加病院	28	24	86%	
	12	13※ ※DPC1病院重複含む	100%	

25

日本の脳卒中救急医療の持続的なKAIZEN



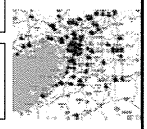
脳卒中救急疫学の確立を目指して

(J-ASPECT Study)

1. 包括的脳卒中センターの要件　（本邦での実態調査）
・専門的人員、診断機器、外科・介入治療、インフラ、教育・研究
・包括的脳卒中ケア能力の指標の開発　（**CSC Score**の提唱）
・研究班ホームページで、研究結果をフィードバック

2. 脳卒中診療医の燃え尽き症候群、立ち去り型退職の実態調査
・　専門医を対象にした、国内最大規模の**Burnout**の横断調査
地方において進行する脳卒中救急医療の崩壊を防ぐための提言

3. **DPC**情報を活用した大規模包括的脳卒中データベースの構築
・ **CSC Scoreとアウトカム**（院内死亡率）との関係を検証
・　過去最大規模　（約270病院、14万件）



4. **GIS**情報と医療機関情報（**DPC**）との連結
・ **GIS**情報（搬送時間）と**アウトカム**（院内死亡率）との関係を検証
・ アウトカムの改善を目的とした実効医療圏域の策定

平成22-24年度　厚生労働科学研究費　（主任研究者　飯原弘二）
「包括的脳卒中センターの整備に向けた脳卒中の救急医療に関する研究」

ご清聴ありがとうございました

平成24年度
J-ASPECT Study 退院患者調査
臨床指標速報値

2013年3月1日

1

対象データ

データ提出類型	DPC調査	入院	外来
1	対象病院	DPC調査データ　全月	EFファイル　全月
2			-
3	準備病院	DPC調査データ　全月（Dファイル除く）	EFファイル　全月
4			-
5	非参加病院	電子レセプトデータ　全月	-

平成23年4月～平成24年3月分

データ対象病院

上段：H23年度
下段：H22年度
（データ年度）

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	20	14	70%	14
DPC/PDPS不参加病院	28	24	86%	
	12	13※ ※DPC1病院重複含む	100%	

3

臨床指標リスト　1

		指標	指標No
アウトカム		入院中の死亡割合	アウトカム-1
		入院から24時間以内の死亡割合	アウトカム-2
		入院から7日以内の死亡割合	アウトカム-3
		入院から30日以内の死亡割合	アウトカム-4
		外科治療、血管内治療から30日以内の死亡割合	アウトカム-5
		30日前後で退院した患者の退院時mRS	アウトカム-6
		全症例の退院時mRSスコア	アウトカム-7
		手術後30日以内の心筋梗塞の発生率	アウトカム-8
		手術後の脳梗塞の発生率	アウトカム-9_1_1～3_3
		院内感染肺炎発生率	アウトカム-10
		頚動脈ステント留置術の施術時の塞栓防止器具使用の有無別死亡率	アウトカム-11
プロセス（共通）	初日	他院からの紹介入院の割合	共通-1
	到着	発症（入院）当日のCT, CTA, MRI, MRAの施行割合	共通-3
	～2日目	VTE予防：入院後2日以内に施行した割合	共通-5
	～退院	脳血管疾患等リハビリテーションの施行割合	共通-6
		早期脳卒中リハビリ施行割合（入院3日以内、入院7日以内）	共通-7
		嚥下障害機能訓練の施行割合	共通-8
		人工呼吸器使用平均日数	共通-9
		各種加算の取得割合（救急医療管理加算、超急性期脳卒中加算、妊産婦緊急搬送入院加算、離島加算、集中治療加算、SCU加算）	共通-12

4

臨床指標リスト　2

		指標	指標No
脳梗塞	～3H	t-PA静注療法の実施割合	脳梗塞-2
	～1日目	入院2日以内の褥瘡の評価実施割合	脳梗塞-3
	～2日目	入院後2日以内の抗血栓療法の実施割合	脳梗塞-4
		歩行困難患者における入院後2日以内のDVT予防実施率	脳梗塞-5
		t-PAを実施した患者の頭蓋内出血の合併症発症割合	脳梗塞-8
	～退院	退院時に心房細動組織合併患者に対する抗凝固療法を施行した割合	脳梗塞-9
		退院時に抗血栓療法を施行した割合	脳梗塞-10
		退院時に脂質異常症患者に高脂血症治療を実施した割合	脳梗塞-11
		退院時の抗血小板薬の適切な処方割合	脳梗塞-12
		内頚動脈狭窄症患者における頚動脈血栓内膜剥離術、経皮的頚動脈ステント留置術の実施割合	脳梗塞-15
		経皮的脳血管形成術、経皮的選択的脳血栓溶解術（頭蓋内、頭部脳血管）の実施割合	脳梗塞-16
		減圧開頭術の実施割合	脳梗塞-17
		頭蓋内外血管吻合術または脳新生血管造成術の実施割合	脳梗塞-18
		発症日から2週間以内の頚動脈血栓内膜剥離または経皮的頚動脈ステント留置術実施割合	脳梗塞-21

5

臨床指標リスト　3

		指標	指標No
非外傷性脳内血腫		抗凝固療法下の脳内出血におけるINR正常化治療の施行割合	非外傷性脳内血腫-1
		脳内血腫除去術の割合	非外傷性脳内血腫-2
クモ膜下出血		クリッピングまたはコイル治療の割合	クモ膜下出血-2
		脳血管攣縮予防治療の動脈瘤根治術後24時間以内の施行および14病日までの継続割合	クモ膜下出血-3
		発症（入院）当日および14日までの経皮的脳血管形成術の実施割合	クモ膜下出血-4
		減圧開頭術、頭蓋形成術の実施割合	クモ膜下出血-5
		水頭症手術　2シャント術の実施割合	クモ膜下出血-6
		脳血管内手術または動脈瘤根治術の実施割合	クモ膜下出血-7
		脳動静脈奇形摘出術の実施割合	クモ膜下出血-8
		塞栓用コイルの最大径	クモ膜下出血-9

6

期間別・疾患別死亡率

上段：H23年度
下段：H22年度
（データ年度）

予定入院含まない

		期間				
		入院中	1日以内	7日以内	30日以内	術後30日以内
3疾患合計※	死亡者数(死亡率)	8,516(12.07%)	1,233(1.75%)	4,786(6.78%)	7,231(10.24%)	966(11.53%)
		6,609(12.17%)	881(1.62%)	3,596(6.62%)	5,413(9.96%)	702(10.06%)
	退院患者数	70,581				8,379
		54,325				6,981
脳梗塞	死亡者数(死亡率)	3,236(7.27%)	114(0.26%)	1,267(2.85%)	2,353(5.29%)	156(9.45%)
		2,567(7.70%)	85(0.25%)	987(2.96%)	1,809(5.42%)	99(8.09%)
	退院患者数	44,519				1650
		33,354				1224
非外傷性脳内血種	死亡者数(死亡率)	3,522(17.34%)	734(3.61%)	2,358(11.61%)	3,216(15.83%)	383(13.56%)
		2,670(16.61%)	502(3.12%)	1,695(10.54%)	2,305(14.34%)	282(11.52%)
	退院患者数	20,311				2824
		16,075				2447
クモ膜下出血	死亡者数(死亡率)	1,785(30.15%)	386(6.52%)	1,170(19.76%)	1,684(28.44%)	437(11.05%)
		1,399(27.81%)	295(5.86%)	921(18.31%)	1,319(26.22%)	329(9.80%)
	退院患者数	5,921				3953
		5,031				3356

※複数の疾患にまたがる退院患者がいるため、疾患ごとの数字の積み上げは必ずしも「3疾患合計」と等しくならない。

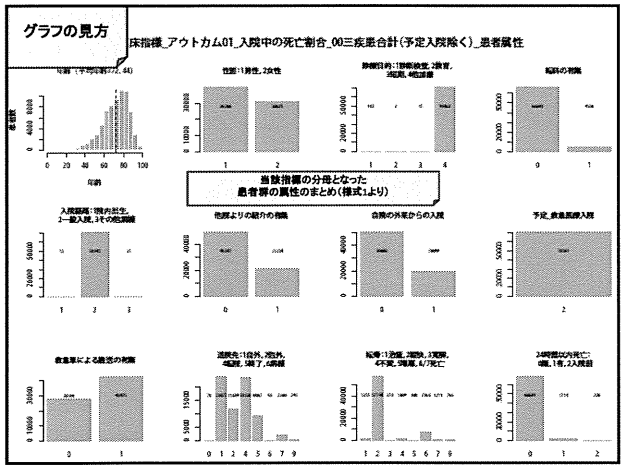
期間別・疾患別死亡率

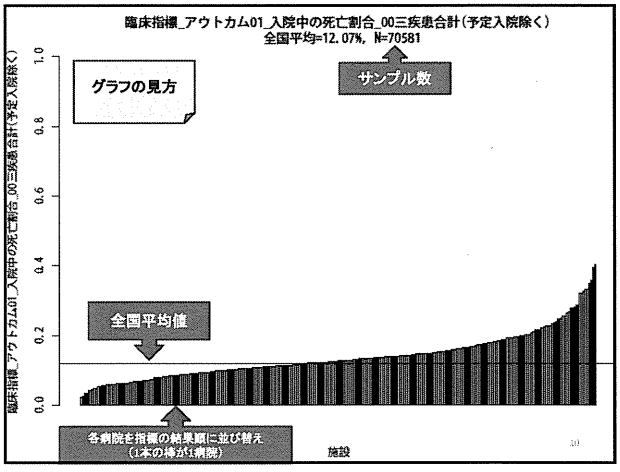
上段：H23年度
下段：H22年度
（データ年度）

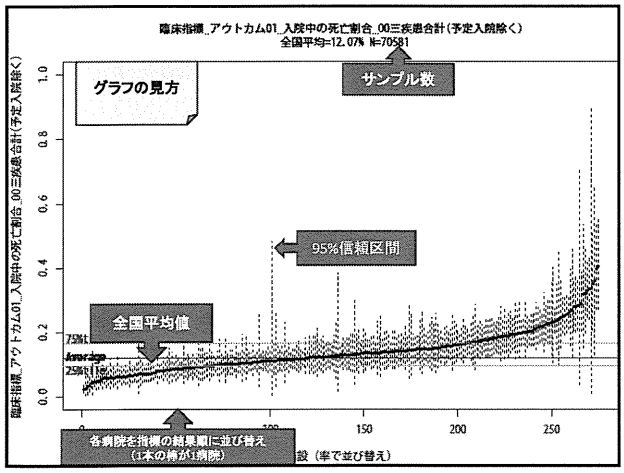
予定入院含む

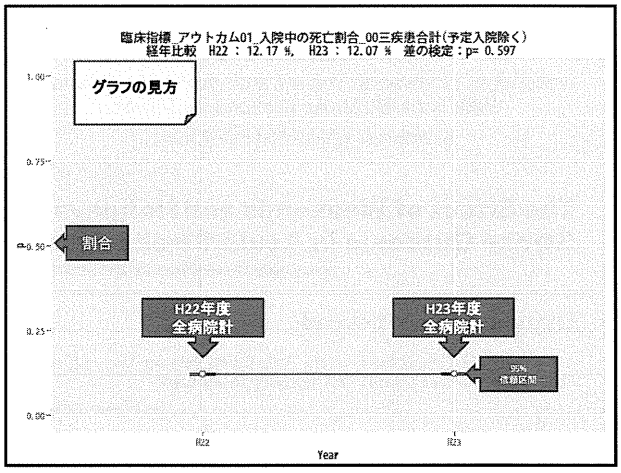
		期間				
		入院中	1日以内	7日以内	30日以内	術後30日以内
3疾患合計※	死亡者数(死亡率)	9,310(10.48%)	1,292(1.45%)	5,076(5.72%)	7,764(8.74%)	1,025(11.11%)
		7,319(10.52%)	931(1.34%)	3,851(5.53%)	5,868(8.43%)	758(9.69%)
	退院患者数	88,810				9,226
		69,589				7,820
脳梗塞	死亡者数(死亡率)	3,737(6.37%)	123(0.21%)	1,390(2.37%)	2,648(4.52%)	177(8.35%)
		2,987(6.64%)	96(0.21%)	1,074(2.39%)	2,027(4.51%)	112(6.94%)
	退院患者数	58,637				2,120
		44,971				1,614
非外傷性脳内血種	死亡者数(死亡率)	3,732(15.73%)	765(3.23%)	2,470(10.44%)	3,377(14.24%)	396(13.31%)
		2,862(15.05%)	528(2.78%)	1,801(9.47%)	2,454(12.91%)	306(11.70%)
	退院患者数	23,718				2,976
		19,013				2,616
クモ膜下出血	死亡者数(死亡率)	1,870(28.08%)	405(6.08%)	1,222(18.35%)	1,763(26.48%)	462(11.05%)
		1,498(25.93%)	308(5.33%)	983(17.02%)	1,407(24.36%)	349(9.59%)
	退院患者数	6,659				4,182
		5,777				3,641

※複数の疾患にまたがる退院患者がいるため、疾患ごとの数字の積み上げは必ずしも「3疾患合計」と等しくならない。









患者受療日・受療時間と死亡率との関係

西村邦宏、嘉田晃子、神谷諭

受療日と予後の関係の先行研究

Weekends: A Dangerous Time for Having a Stroke?

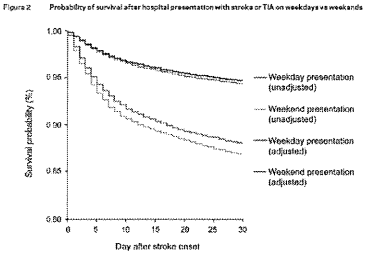
TABLE 2. Outcome Measures and Weekend Effect

Outcomes	Weekday Admissions, n=20 047 (%)	Weekend Admissions, n=6629 (%)	Weekend Effect OR (95% CI)
Discharge to place of residence	9777 (48.7)	2972 (44.8)	0.85 (0.80–0.90)
Mortality at 7 days	1476 (7.4)	563 (8.5)	1.17 (1.06–1.29)
Mortality at discharge	3077 (15.3)	1088 (16.4)	1.08 (1.004–1.17)

Saposnik et al. *Stroke*. 2007;38:1211-1215.

受療日と予後の関係の先行研究

Association between weekend hospital presentation and stroke fatality



Canada

平日と週末の入院の比較で、年齢、性、重症度(Canadian NS)、併存疾患調整後も週末は7日後死亡率が有意に高かった (adjusted hazard ratio 1.12, 95% CI: 1.00-1.25) (Neurology 2010 Nov 2;75(18):1589-1596.)

受療時間と予後の関係の先行研究

Off-Hour Admission and In-Hospital Stroke Case Fatality in the Get With The Guidelines-Stroke Program

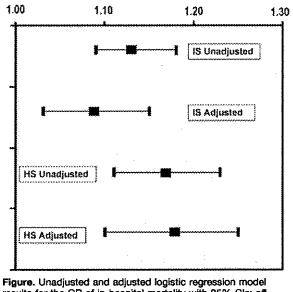


Figure. Unadjusted and adjusted logistic regression model results for the OR of in-hospital mortality with 95% CIs: off-hours presentation versus on-hours presentation for IS and HS.

USAの8州、
虚血性・出血性脳卒中

年齢、性、人種、病床数、併存症、地域などを調整後も、時間外入院の患者の院内死亡率は有意に高かった

(*Stroke*. 2009;40:569-576.)

その他先行研究

Associations of Physician Volume and Weekend Admissions With Ischemic Stroke Outcome in Taiwan

A Nationwide Population-Based Study

(*Med Care* 2009;47: 1018–1025)

The Effect of Weekends and Holidays on Stroke Outcome in Acute Stroke Units

Hasegawa et al. *Cerebrovasc Dis* 2005;20:325-331.

Dying for the Weekend

A Retrospective Cohort Study on the Association Between Day of Hospital Presentation and the Quality and Safety of Stroke Care

(*Arch Neurol*.2012,1-7.)

CSCのweekend effectへの影響に関する研究

Can Comprehensive Stroke Centers Erase the 'Weekend Effect'?

Table 5. Sites 1 and 2 combined: in-hospital mortality

	In-hospital mortality	
	weekend	weekday
All strokes, %	8.2 (65/788)	8.2 (114/1,392)
	p = 0.94	
ICH, %	22.5 (38/169)	22.1 (69/312)
	p = 0.87	
IS (without IV t-PA), %	3.8 (15/391)	3.5 (23/661)
	p = 0.88	
AIS (with IV t-PA), %	8.7 (12/138)	10.1 (22/218)
	p = 0.84	
TIA, %	0 (0/90)	0 (0/201)
	n/a	

Values in parentheses are numbers of patients or ranges.

USAの2つのCSC

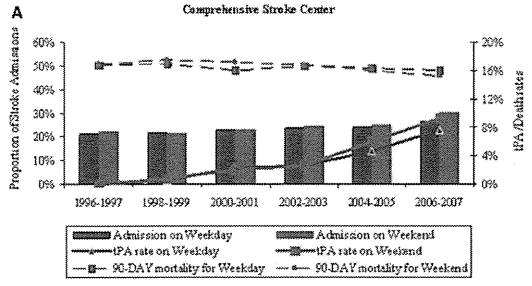
年齢、性、人種、NIHSS、血糖値を調整

有意差認めなかった

Cerebrovasc Dis 2009;27:107–113

CSCのweekend effectに関する研究

Comprehensive Stroke Centers Overcome the Weekend Versus Weekday Gap in Stroke Treatment and Mortality



CSCでは認定を開始した2007年に週末入院の90日後死亡が平日入院のそれより少なくなった。McKinney J.S. et al. *Stroke*. 2011;42:2403-2409

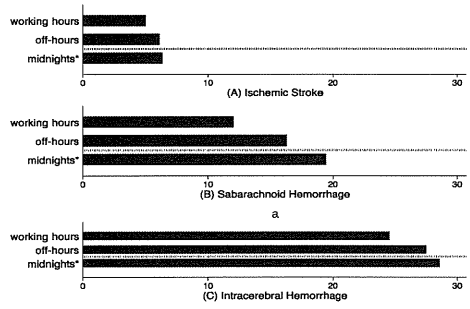
J-ASPECT study

解析対象(2010年度DPC):53,170例、約250施設

週末(土日祝日)入院と死亡率

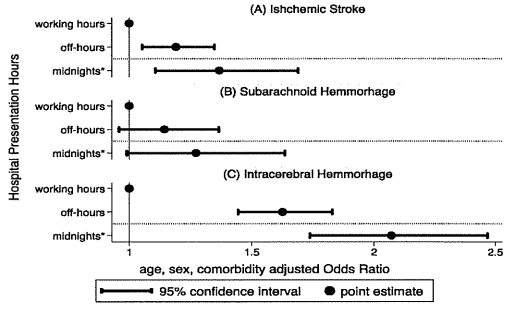
	平日	土日祝	合計
生存	33,788	14,041	47,829
30日以内死亡	3,612 (9.7%)	1,729 (11.0%)	5,341 (10.1%)
合計	37,400	15,770	53,170

入院時間帯と30日以内死亡率の関係

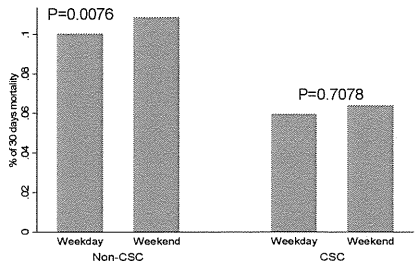


平日診療時間内 vs 時間外、平日診療時間内 vs 深夜の比較で全ての病型で統計学的に有意差あり

入院時間帯と30日以内死亡率の関係



CSC scoreと30日以内死亡の関係



High-CSC scoreの施設とそれ以外の施設で、死亡率を比較　high score施設では有意差を認めなかった(ISC2013で発表)

CSC scoreと死亡率の関係

診療時間内vs時間外の30日以内死亡の比較、CSC score

	IS		SAH		ICH	
score	adjusted OR (95% CI)	p	adjusted OR (95% CI)	p	adjusted OR (95% CI)	p
<=13	reference	—	reference	—	reference	—
14, 15	0.91 (0.72-1.16)	0.44	0.92 (0.69-1.22)	0.56	0.75 (0.60-0.95)	0.01
16, 17	0.94 (0.76-1.17)	0.6	0.89 (0.69-1.14)	0.36	0.92 (0.75-1.12)	0.41
19<=	0.79 (0.62-1.02)	0.07	0.69 (0.51-0.93)	0.02	0.80 (0.63-1.02)	0.07

他に年齢、性、病床数、教育病院, 都市分類、DPCの有無を調整

解析モデルの中で、高いCSC scoreは死亡率を減らす方向に有意性を示した

時間帯毎のCSCscoreと死亡率の関連

時間を区切って解析 (平日診療時間内)

	IS		SAH	
CSC score	adjusted OR (95% CI)	p	adjusted OR (95% CI)	p
<=13	reference	—	reference	—
14<=cscs<=15	0.98 (0.71–1.35)	0.89	0.96 (0.65–1.41)	0.83
16<=cscs<=17	0.80 (0.59–1.09)	0.16	0.84 (0.59–1.19)	0.33
19<=	0.68 (0.48–0.97)	0.03	0.60 (0.40–0.91)	0.02

年齢、性、病床数、教育病院, 都市分類、DPCの有無を調整

CSC scoreが高い施設ほど低い30日以内死亡と関連が強い.
深夜のSAHにおいても統計学的な有意差を認めている

これまでの結果と今後の検討課題

- 我が国でも入院日・時間帯による死亡率に差を認める
- CSC scoreの高い施設では死亡率の差が軽減する傾向がある

今後の検討課題

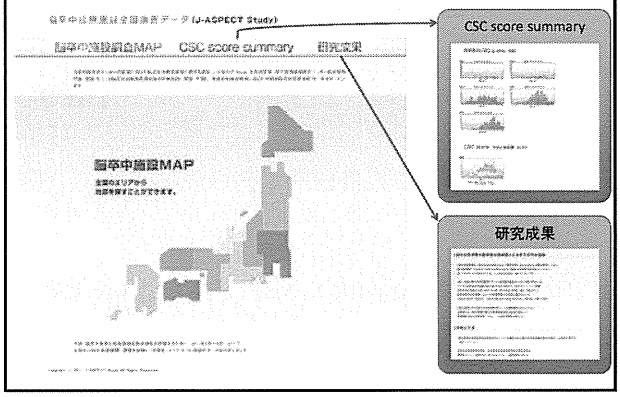
- 病型毎・時間帯毎の詳細な解析
- 重症度(JCS)を考慮した考察
- CSC componentの分析
- 死亡率の差の背景の分析
- Charlson scoreによる重症度調整

結果のフィードバックに関して

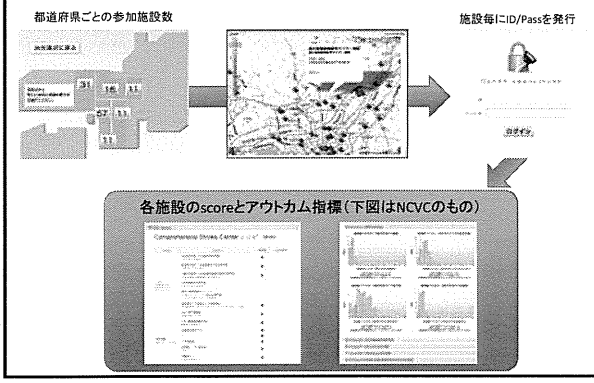
国立循環器病研究センター 研究開発基盤センター
予防医学・疫学情報部/知的資産部 IT戦略室
飯原班一班会議(2013/03/01)

西村 邦宏/岩田 倫明

J-ASPECT Study ホームページ



施設調査マップ



本ホームページが果たす役割

- 脳卒中救急医療の実態を体系的に調査，把握し，その結果を公表
- 参加施設毎に，集計したデータを公表
  - 地域特性の把握による医療体制づくり(マクロ)
  - 個々の参加施設の医療体制の向上に(ミクロ)
- 経年変化による個別病院ベンチマークの変動の集積
  - アウトカムとベンチマークによる治療成績向上に関する研究が可能
  - クラスターランダマイゼーションによる介入研究など

本ホームページの今後

- 参加施設へのフィードバックの仕組み
  - 調査データを役立てていただくために
  - 参加施設でデータを入力・更新し，アウトカム指標を返す
    - 即時性のあるフィードバック⇒更新のモチベーション
- 施設調査のアンケートの更新、新規参加施設でのweb集計が可能であれば望ましい一既参加施設には関しては前年度の結果のうち変更箇所のみ更新することでよりuser friendlyに
- 将来的に個別症例のデータをフィードバックし、NIHSSなど入力すれば、より精緻なデータベースの構築が可能？(reporting card のEDC化)

Cross-Sectional Survey of Workload and Burnout among Japanese Physicians Working in Stroke Care: The J-ASPECT Study

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Short title: Nishimura, J-ASPECT Study

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Journal Subject Code: [8] Epidemiology

Abstract

Background: Burnout is common among physicians and affects the quality of care. We aimed to determine the prevalence of burnout among Japanese physicians working in stroke care and evaluate personal and professional characteristics associated with burnout.

Methods and Results: A cross-sectional design was used to develop and distribute a survey to 11,211 physicians. Physician burnout was assessed using the Maslach Burnout Inventory General Survey and psychological well-being using the Short-Form 36-Item Health Survey. The predictors of burnout and the relationships among them were identified by creating a generalized linear model and multivariate regression analysis. A total of 2,724 (25.3%) physicians returned the surveys. After excluding those who were not working in stroke care or did not complete the survey appropriately, 2,564 surveys were analysed. Analysis of the participants' scores revealed that 41.1% were burned out, 58% had mild symptoms of depression, and 27.1% had severe symptoms of depression. Multivariate analysis indicated that number of hours worked per week, hours slept per night, holidays per week, after-hours calls per week, and years of experience, as well as income are significant predictors of burnout. Number of hours worked per week and sleep time were found to be the strongest predictor.

Conclusion: The primary risk factors for burnout are heavy workload, short sleep duration, and relatively little experience, among which workload is the strongest predictor. Prospective

research is required to confirm these findings and develop programs for preventing burnout.

Key words: burnout, Japanese Neurosurgical Society, Japanese Society of Neurology, J-ASPECT study, Maslach Burnout Inventory, neurosurgery, stroke, tissue plasminogen activator

Introduction

Burnout is a syndrome characterized by emotional exhaustion and depersonalization leading to decreased effectiveness at work.[1] In a recent large survey of U.S. physicians working in all medical fields, approximately 40% of neurosurgeons were found to have experienced symptoms of burnout.[2] Another U.S. study found that approximately 40% of surgeons were burned out and 30% were depressed (as assessed by depression symptom screening),[3] conditions that are both associated with medical errors.[4 5] Recent studies suggest that burnout may influence quality of care and lead to early retirement.[6] However, limited research has been conducted into the relationship between specific demographic and practice characteristics and burnout among physicians working in stroke care, and no survey research has been conducted among Japanese physicians. Such lack of research is troubling, as stroke is the fourth-leading cause of death in Japan, as well as a leading cause of long-term disability.[7]

Recognizing the importance of understanding the relationship between physician well-being and stroke care, the Ministry of Health, Labor and Welfare of Japan has been subsidizing the J-ASPECT study, a nationwide analysis of emergency medical services and comprehensive stroke care centres in Japan. The J-ASPECT study group, a national task force, is responsible for investigating stroke care program in Japan, including that provided in comprehensive stroke care centres. In tandem with increased recognition of burnout among Japanese

physicians working in stroke care, the J-ASPECT study group has been examining the impact of burnout on physician sustainability and patient outcomes. In accordance with this focus, the objective of this study was to determine the prevalence of burnout among Japanese neurosurgeons and neurologists working in stroke care and evaluate the personal and professional characteristics associated with burnout among this physician population. By doing so, this study was able to examine the hypothesis that the most important risk factor for burnout among physicians working in stroke care is an excessive workload, as assessed by the number of hours worked per week.

Methods

Study design

In March 2011, a cross-sectional survey was sent to 11,211 physicians, among whom were all board-certified members of the Japanese Neurosurgical Society and the Societas Neurologica Japonica working in stroke care throughout Japan. The survey was developed by J-ASPECT researchers, based on the previous studies on physician burnout. We sent the survey to a total of 10,791 physicians via postal mail; however, we could not mail the questionnaire to 420 physicians in the 3 Tohoku prefectures that were affected by Great Tohoku Earthquake. The cover letter accompanying the survey informed the physicians that only physicians who are currently working for stroke care are eligible for the survey, that

their participation was voluntary, and that their responses would remain anonymous. They were requested to return the completed survey within 8 weeks. The survey contained items that collected data regarding relevant demographic variables, including age, sex, occupation, relationship status, current employment status, and income; items that collected data regarding variables related to practice patterns, including years of experience providing stroke care, certification status on the relevant medical boards, mean number of hours worked per week, mean number of nightshifts worked per month, mean number of after-hours calls taken per week, mean number of hours slept per night, and mean number of cases treated by tissue plasminogen activator (t-PA) per year; items that allowed for self-assessment of burnout; and, for neurosurgeons, items that collected data regarding mean number of all operations, stroke-related operations, and emergency operations performed per year. This study was approved by the Institutional Review Board of the National Cerebral and Cardiovascular Center, Japan.

Measurement of burnout, depression, and quality of life

Burnout among physicians was measured using the Japanese version of the Maslach Burnout Inventory-General Survey (MBI-GS), a validated version of the Maslach Burnout Inventory (MBI), which is currently considered the gold standard for measuring burnout.[8-10] This 16-item questionnaire[11 12] contains 3 subscales that evaluate what are considered the 3

major domains of burnout: exhaustion, cynicism (depersonalization), and professional efficacy. Based on the results of previous studies using the MBI-GS, which reported that a high score on the emotional exhaustion and/or depersonalization subscale is an indication of physician burnout,[2 10 13 14] and the findings from a survey of Japanese population,[15] an exhaustion score greater than 4.0 and/or a cynicism (depersonalization) score greater than 2.6 were selected as primary criteria for burnout. The criteria for severe burnout status were an exhaustion score greater than 4.0 and either a cynicism score greater than 2.6 or a professional efficacy score lower than 4.17. The use of at least one additional criterion for severe burnout (i.e. the use of 'exhaustion+1' criteria) was adopted because exhibiting at least one other symptom of burnout besides exhaustion has been reported to be a more appropriate and reliable indicator of severe burnout among the general population [16] compared to the approaches used in former studies of physician burnout.

Psychological well-being was assessed using the Mental Health (MH) subscales of the Medical Outcome Study Short-Form 36-Item Health Survey (SF-36), a valid and reliable instrument for measuring health-related quality of life.[17 18] The scores of the individual items were summed to produce a score scale ranging from 0 to 100, with higher scores indicating better mental health, and then examined to determine whether the participants exhibited symptoms of depressions according to the criteria of Yamazaki et al.[19] For comparison of the study population with the general population of Japanese workers, the MBI-GS scores of the

participants were compared with the MBI-GS scores of 2,843 Japanese office workers and 751 civil servants that one of our investigators had previously published.[15]

Statistical analysis

Standard descriptive summary statistics were used to determine whether the participants had not been burned out, had been burned out, or had been severely burned out at the time of the survey. Continuous variables were analysed using the t-test for independent and paired samples or the Mann-Whitney U test for independent samples and Wilcoxon's rank test for paired samples. The Cochran–Armitage test was used to identify any trends in the data. All statistical analyses were conducted using SAS version 9.3 (SAS Institute Inc., Cary, NC, USA) and STATA 11 (STATA Corp., College Station, TX, USA) software, all tests were 2-sided, and all values that had a p-value less than 0.05 were considered significant.

As the study design was cross-sectional in nature and use of the odds ratio (OR) often leads to overestimation if the baseline prevalence of an outcome is common,[20 21] a multivariate generalized linear model with the link of complementary log–log with binomial family (complementary log–log regression)[22 23] was used to identify demographic and professional characteristics associated with burnout. In this model, burnout was considered the primary outcome and a dichotomized variable and other demographic and practice pattern variables were considered potential predictors of burnout. Age and sex were considered potential

confounders, and adjustment was accordingly conducted for all analyses. Determinants of hours worked and slept were analysed by multivariate linear regression. Forward selection using the Bayesian information criterion (BIC) was used to select the best predictors. Observations from the missing data in the survey questionnaire were not incorporated in this study. The interaction (effect modification) between predictors was determined by evaluating whether the interaction terms were significant.

Results

Burnout among Japanese physicians working in stroke care

Figure 1 shows the process used to select the study participants. Of a total of 11,211 board-certified neurosurgeons and neurologists practicing in any prefecture excluding the three prefectures affected by the Tohoku earthquake (n = 469), 2,724 (25.3%) returned the survey. Among these, 2,635 (97.0%) completed the questionnaire appropriately for analysis of their responses. After excluding 71 (2.7%) physicians who reported that they were not working actively in the field of stroke care, a total of 2,564 physicians remained for analysis. At the time that they completed this survey, the study population had been in practice for a mean of 21.7 years, worked a mean of 66.3 hours per week, were on duty a mean of 2.91 nights per month, and received a mean of 2.00 after-hours calls per week. Among these 2,564 physicians 1,525 (59.4%) were employed at 578 teaching hospitals or comprehensive stroke

centres that were participating in a survey of comprehensive stroke centres as part of the J-ASPECT study group. As 3,757 physicians were working at institutes participating in the J-ASPECT study in March 2011, the average response rate among active stroke-care centre physicians was estimated at 40.6%. Other relevant personal characteristics regarding the study population are summarized in Table 1.

Review of the participants' MBI-GI scores indicates that 41.1% (N = 1,055) of the study population was burned out and 21.8% (N = 560) was severely burned out at the time of the survey (Figure 2). Consideration of the scores of the study population as representative of the population of Japanese physicians working in stroke care and comparison of their scores with the MBI-GS scores of 2,843 office workers (2339 male and 501 female) and 751 civil servants (375 male and 374 female) indicates that the prevalence of burnout and severe burnout among stroke care physicians (41.1% and 21.8%, respectively) is significantly higher than that among civil servants (28.8%, $p < 0.001$ and 17.8%, $p = 0.0268$, respectively) and office workers (27.1%, $p < 0.001$ and 12.2%, $p = 0.004$, respectively). Further analysis of the study population's mental health scores indicated that 58% had mild symptoms of depression and 26.6% had symptoms of severe depression according to MH-5 criteria. Analysis of these mental health scores indicated that 27.8% had a mental quality of life (QOL) score more than 1 standard deviation below the population norm

Relationship between burnout and workload, sleep duration, and work experience