Article:

Sammy, I.A. orcid.org/0000-0003-4265-5569, Chatha, H., Bouamra, O. et al. (3 more authors) (2017) The use of whole-body computed tomography in major trauma: variations in practice in UK trauma hospitals. Emergency Medicine Journal. ISSN 1472-0205

https://doi.org/10.1136/emermed-2016-206167

Emergency Medicine Journal

The use of whole body CT in major trauma: variations in practice in UK trauma hospitals

Journal:	*Emergency Medicine Journal*
Manuscript ID	emermed-2016-206167.R2
Article Type:	Original article
Date Submitted by the Author:	n/a
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Keywords:	emergency department, imaging, CT/MRI, major trauma management, resuscitation, Trauma, majot trauma management

TITLE: The use of whole body CT in major trauma: variations in practice in UK trauma hospitals

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Word Count: 2,994 words (excluding title page, abstract, tables, figure legends and references)

Contributorship Statement:

Ian Sammy and Hridesh Chatha conceived the original research idea, developed the research method and contributed to data analysis and interpretation. Fiona Lecky supervised and contributed substantially to the development of the research method and data interpretation. Omar Bouamra advised on the research method, analysed the data and contributed towards data interpretation. Marisol Fragoso-Iñiguez contributed to development of the research methods, data analysis and interpretation and Antoinette Edwards contributed to development of the research methods and data interpretation. All authors contributed substantially to the preparation of the final manuscript.

What is Already Known on This Subject

- The use of whole body CT in trauma varies widely from country to country
- There are no universally accepted evidence based guidelines for the use of whole body CT in trauma
- We do not know how whole body CT is used in hospitals in the United Kingdom

What This Study Adds

-This analysis of prospectively collected data from a national trauma registry showed that there are significant differences in the use of whole body CT between major trauma centres and trauma units

- There is also wide variation in the use of whole body CT between different individual hospitals in England and Wales

Abstract

Introduction

Whole body computed tomography (WBCT) use in trauma patients in England and Wales is not well documented. WBCT in trauma can reduce time to definitive care, increasing survival. However, its use varies significantly worldwide.

Methods

We performed a retrospective observational study of Trauma Audit and Research Network data from 2012 - 2014. The proportion of adult patients receiving WBCT during initial resuscitation at major trauma centres (MTCs) and trauma units/non-designated hospitals (TUs/NDHs) was compared. A model was developed that included factors associated with WBCT use, and centre effects within the model were explored to determine variation in usage beyond that expected from the model.

Results

Of the 115,664 study participants, 16.5% had WBCT. WBCT was performed 5 times more frequently in MTCs than TUs/NDHs (31% vs 6.6%). In the multivariate model, increased injury severity, low Glasgow coma score, shock, comorbidities and triage category increased the chances of having a WBCT, but there was no consistent relation with age. High falls and motor vehicle collisions also increased WBCT usage. Adjusting for casemix, there was a 13-fold intra-hospital variation in the use of WBCT between MTCs and a 30-fold variation between TUs/NDHs. The amount of variability between individual hospitals that could not be accounted for by the factors shown to impact on WBCT use was 26% (95% CI 17% - 39%) for MTCs and 17% (95% CI 13% - 21%) for TUs/NDHs.

Conclusion

There are significant variations in WBCT use between different hospitals in England and Wales, which require further investigation.

Introduction

Whole body computerised tomography (WBCT) is an imaging strategy which uses non-contrast and contrast enhanced CT scanning of the head, neck, and torso in selected critically injured patients, with or without specific clinical signs of injury in these regions. Whole body CT has been used as a primary investigation in the management of major trauma patients for several years worldwide, though the indications for its use are without a firm evidence base (1, 2, 3).

While WBCT in trauma is widely utilised in the United States, there has been variable uptake in other countries (4, 5). Across the United Kingdom, there are no universal guidelines for the use of whole body CT in major trauma. Several authorities, including the Royal College of Radiologists (RCR) and the National Institute for Clinical Excellence (NICE), have proposed guidelines for WBCT in trauma, but these have not been validated, and are not used by all trauma receiving hospitals (3, 5, 6).

Several authors report improved patient survival, improved diagnostic accuracy and shorter time to definitive diagnosis and treatment with WBCT use (7-11). However, CT scanning is associated with an increased risk of cancer in later life, which must be considered when ordering such investigations (12). Consequently, there are significant variations between countries in WBCT use in trauma. The reported proportion of trauma patients receiving WBCT ranges from 85% in Sweden to 9.3% in Australia, though this variation may partly be explained by differences in patient characteristics between studies (2, 4, 13).

The degree of variation in WBCT use in the England and Wales is not documented; understanding this is an important initial step in the development and implementation of guidelines for WBCT in major trauma. We therefore undertook an analysis of TARN data, to determine the use of WBCT for adult major trauma patients (aged ≥16 years) in hospitals in England and Wales. The Trauma Audit and Research Network maintains a database of major trauma patients admitted to all trauma receiving hospitals in England, Wales, The Republic of Ireland and selected hospitals in Europe, to monitor the effectiveness of trauma care, using a methodology based on the TRISS model (14). TARN collects information on patient characteristics (such as age, gender and injury severity) and process factors (including use of CT scans and WBCT) (15). Patients are included in the TARN database if their length of stay is ≥72 hours or they are admitted to a high dependency area or die in hospital or are transferred to another hospital for specialist/critical care).

Methods

The primary aims of this retrospective observational study were to determine the proportion of major trauma patients receiving whole body computerised tomography (WBCT) as part of their Emergency Department (ED) management and to assess the variation in use between hospitals in England and Wales, using data from the TARN database. The study also sought to identify factors associated with WBCT use, and compare the use of WBCT in major trauma centres (MTCs) to that in trauma units (TUs) and non-designated hospitals (NDHs). The study period extended from 1st January 2012 to 31st December 2014. This time period was chosen as it coincided with the roll-out of regional trauma services in England, and allowed comparisons between patients admitted to major trauma centres (MTCs) vs trauma units (TUs) and non-designated hospitals (NDHs). Trauma care in England is currently organised on a regional basis in a hub-and-spoke arrangement, with MTCs (hospitals equipped to manage all severities of trauma) receiving the majority of seriously injured patients, either directly, or as secondary transfers from TUs. Trauma units (TUs) are smaller peripheral hospitals, able to deal with less seriously injured patients but which do not have the full complement of trauma services. Non-designated hospitals (NDHs) are hospitals not included in any structured trauma system (for example Welsh hospitals), and therefore not designated as either MTCs or TUs. In general they do not have the full capability of MTCs and share more in common with TUs. Patients were excluded from our study if they were secondary admissions to an MTC from a TU or NDH.

The study included all adult patients (aged ≥16 years) admitted to trauma receiving hospitals in England and Wales, whose details were registered on the TARN database. Information extracted for each patient included demographic data, injury characteristics, hospital type (MTC vs TU/NDH) and data on CT use. For categorical data, categories were chosen to coincide with those commonly used at TARN. Missing data were analysed as a category within the variable, in order to minimise the loss of cases. While imputation may have been more useful, this was not pursued as some variables had a high percentage of missing data, such as Charlson comorbidity index (19.6%), making imputation less reliable.

The study investigated the use of WBCT during resuscitation. This did not include WBCTs performed after initial emergency surgery or following admission to the intensive care unit. WBCT use at major trauma centres (MTCs) was compared to its use in trauma units (TUs) and non-designated hospitals (NDHs). We also assessed the inter-hospital variation in WBCT usage between individual trauma-receiving hospitals.

The impact of various clinical and demographic covariates (age, gender, comorbidities, injury severity, Glasgow coma score, systolic blood pressure, mechanism of injury, and triage category) on the odds of having a WBCT was also determined. Using multivariate logistic regression, a model was then constructed to determine the extent to which variations in usage of WBCT could be explained by known variables. Only those covariates found to have an association with WBCT on univariate analysis were included in the final multivariate analysis. Adjusted odds ratios were presented with their 95% confidence intervals. For all comparisons, a 'p' value of <.05 was considered statistically significant.

The degree of variation between individual hospitals was also calculated. Binomial regression analysis was used to demonstrate unadjusted odds of having a whole body CT for each hospital, compared with the overall odds for having a WBCT in MTCs and TUs/NDHs, respectively. Multi-level modelling (using the covariates identified in the original multivariate analysis) was used to demonstrate the variation in adjusted odds of having a whole body CT between individual MTCs and TUs/NDHs, fitting centres as random intercepts in the model (16). Sensitivity analysis was performed on calculations of intra-hospital variance in WBCT usage, by excluding hospitals with data completeness of 50% or less. TARN defines data completeness as the proportion of cases submitted to TARN compared to the number of cases identified in the HES/HSW dataset(s) that appear to meet the TARN inclusion criteria. Data were analysed using SPSS (version 21) and Stata (version 14).

TARN publishes rates of survival for all trauma receiving hospitals across England and Wales, aiding clinical governance. This benchmarking activity is supported by Section 251 approval to process certain information without specific informed patient consent. Data for this study came exclusively from the TARN database without author access to patient records and we used the same principles toward patient consent and ethical approval as described for the TARN benchmarking role.

Results

During the study period, 126,116 patients 16 years and older were entered onto the TARN database. 10,452 were transfers from TUs to MTCs, leaving 115,664 patients who fulfilled the study's inclusion criteria. Of these, 46,969 (40.6%) were treated in major trauma centres (MTCs) and 68,695 (59.4%) were treated in trauma units (TUs) and non-designated hospitals (NDHs). Thirty two percent (32.0%) of patients had an injury severity score of >15 (36,974 patients). There were 62,748 patients aged <65 years (54.3%) and 52,916 (45.7%) aged ≥65 years. 63,903 (55.2%) were male and 51,761 (44.8%) were female. The most common mechanism of injury was low falls, accounting for 64,222 (55.5%) patients.

The univariate associations between various factors and the likelihood of having a WBCT are shown in Table 1, while multivariate associations are shown in Table 2. In the multivariate model, patients admitted directly to major trauma centres were more likely to have WBCT compared to those admitted to trauma units and non-designated hospitals (AOR 3.18; 95% CI 3.05 - 3.33). Further analysis of use of WBCT by time of day showed that the percentage of trauma patients having WBCT during working hours (29.6% at MTCs and 5.6% at TUs/NDHs) was less than the percentage having WBCT on evenings and weekends (32.1% at MTCs and 7.1% at TUs/NDHs).

Triage positive patients (those fulfilling the criteria for direct admission to a major trauma centre) were significantly more likely to have a WBCT compared to triage negative patients on multivariate analysis (AOR 2.66; 95% CI 2.49 - 2.84). However, 73,126 patients (63.2%) did not have their triage category recorded. In addition, only 89.9% of triage-positive patients were admitted directly to an MTC, while 37.7% of triage-negative patients were also admitted directly to an MTC.

On multivariate analysis, the adjusted odds of having a WBCT was not significantly different between men and women. However, there was an interaction between age and gender: younger females (aged 16 – 44 years) were more likely than their male counterparts to have a whole body CT, but for the older age groups, this trend was reversed. Overall, there was no significant increase in the adjusted odds of having a WBCT with increasing age. Patients with a higher Charlson comorbidity index (CCI) were more likely to have a WBCT than those with a CCI of 0 (Table 2).

In the multivariate model, injury severity, injury mechanism, systolic blood pressure and Glasgow coma score were all associated with increased odds of having a WBCT. Compared to patients with an ISS of <9, the adjusted odds of having a WBCT in patients with ISS of ≥25 was 3.95 (95% CI 3.67 – 4.24). The adjusted odds of having a WBCT were significantly higher for patients involved in road traffic collisions (AOR 12.58; 95% CI 11.83 - 13.38) and high falls (AOR 8.43; 95% CI 7.92 – 8.96), compared to low falls. Patients with a systolic blood pressure (SBP) below 110 mmHg were significantly more likely to have a WBCT than those with a higher SBP, as were patients with a GCS lower than 15 when compared to those with GCS 15 (Table 2).

The overall accuracy of the multivariate model was high with an R-square statistic of 0.35 and an AUROC of 0.890 (95% CI 0.887 - 0.892).

	Covariate	TOTAL	WBCT (%)	Unadjusted Odds Ratio (95% CI)
Total		115,664	19,061 (16.5%)	
Age (years)	16-44	30,211	8,623 (28.5%)	(Reference)
	45-54	14,602	3,007 (20.6%)	0.65 (0.62 - 0.68)
	55-64	17,935	2,359 (13.2%)	0.38 (0.36 - 0.40)
	65-75	13,426	2,048 (15.3%)	0.44 (0.42 - 0.46)
	>75	39,490	3,024 (7.7%)	0.21 (0.19 - 0.21)
Gender	Male	63,903	13,554 (21.2%)	(Reference)
	Female	51,761	5,507 (10.6%)	0.44 (0.43 - 0.46)
CCI	0	63,653	12,303 (19.3%)	(Reference)
	1 to 5	28,313	3,257 (11.5%)	0.54 (0.52 - 0.57)
	6 to 10	8,008	731 (9.1%)	0.42 (0.39 - 0.45)
	>10	3,432	372 (10.8%)	0.51 (0.45 - 0.57)
	Unrecorded	12,258	2,398 (19.6%)	1.02 (0.97 - 1.07)
Triage Category	Negative	24,954	2,042 (8.2%)	(Reference)
	Positive	17,584	9,045 (51.4%)	11.88 (11.17 - 12.64)
	Unrecorded	73,126	7,974 (10.9%)	1.37 (1.31 - 1.45)
ISS	ISS <9	24,891	2,119 (8.5%)	(Reference)
	ISS 9-15	53,799	5,322 (9.9%)	1.17 (1.12 - 1.24)
	ISS 16-24	25,887	6,014 (23.2%)	3.25 (3.08 - 3.43)
	ISS ≥25	11,087	5,606 (50.6%)	10.99 (10.29 - 11.74)
MOI	Low falls	64,222	2,105 (3.3%)	(Reference)
	High falls	15,930	5,163 (32.4%)	14.15 (13.33 - 15.02)
	RTCs	24,110	10,521 (43.6%)	22.82 (21.54 - 24.23)
	Other	11,402	1,272 (11.2%)	3.71 (3.44 - 3.99)
Glasgow Coma Score	GCS 15	81,164	11,020 (13.6%)	(Reference)
	GCS 13-14	12,890	3,004 (23.3%)	1.93 (1.85 - 2.02)
	GCS 9-12	3,407	1,024 (30.1%)	2.74 (2.53 - 2.95)
	GCS 6-8	1,663	581 (35.0%)	3.43 (3.09 - 3.80)
	GCS 4-5	742	280 (37.7%)	3.86 (3.32 - 4.48)
	GCS 3	2,889	1,319 (45.7%)	5.35 (4.95 - 5.78)
	Unrecorded	12,909	1,833 (14.2%)	1.05 (1.00 - 1.11)
Systolic Blood Pressure	SBP ≥110	95,026	15,116 (15.9%)	(Reference)
	SBP <110	12,833	3,105 (24.2%)	1.69 (1.61-1.76)
	Unrecorded	7,805	840 (10.8%)	0.64 (0.59 – 0.69)
Hospital Designation	TU/NDH	68,695	4,507 (6.6%)	(Reference)
	MTC	46,969	14,554 (31%)	6.39 (6.16 - 6.64)

Table 1: Frequencies of all CT scans and WBCTs for different sub-groups of patients, with unadjusted odds ratios for usage of WBCT. 'CCI' = Charlson comorbidity index; ISS = injury severity score; MOI = mechanism of injury.

	Covariate	Adjusted Odds Ratio (95% CI)	'p' value
Age	16 - 44	(Reference)	
	45 - 54	1.01 (0.94 - 1.08)	0.856
	55 - 64	0.92 (0.85 - 0.99)	0.026
	65 - 75	1.06 (0.98 - 1.15)	0.146
	>75	0.95 (0.88 - 1.04)	0.261
Gender	Male	(Reference)	
	Female	1.04 (0.97 - 1.12)	0.282
Age#Gender	16-44#Female	(Reference)	
	45 - 54#Female	0.88 (0.77 - 1.01)	0.063
	55 - 64#Female	0.87 (0.76 - 0.99)	0.041
	65 - 75#Female	0.83 (0.72 - 0.95)	0.007
	>75#Female	0.74 (0.66 - 0.84)	<0.001
CCI	0	(Reference)	
	1 to 5	1.22 (1.15 - 1.28)	<0.001
	6 to 10	1.25 (1.13 - 1.38)	<0.001
	>10	1.37 (1.20 - 1.56)	<0.001
	Unrecorded	0.94 (0.89 - 1.01)	0.074
Triage Category	Negative	(Reference)	
	Positive	2.66 (2.49 - 2.84)	<0.001
	Not recorded	1.24 (1.17 - 1.32)	<0.001
Injury Severity Score	ISS <9	(Reference)	
	ISS 9 - 15	1.19 (1.12 - 1.26)	<0.001
	ISS 16 - 25	2.16 (2.03 - 2.30)	<0.001
	ISS >25	3.95 (3.67 - 4.24)	<0.001
MOI	Low Falls	(Reference)	
	Vehicle Incident/Collision	12.58 (11.83 - 13.38)	<0.001
	Fall from Heights	8.43 (7.92 - 8.96)	<0.001
	Other	1.87 (1.72 - 2.04)	<0.001
Glasgow Coma Score	GCS 15	(Reference)	
	GCS 13 - 14	1.39 (1.26 - 1.54)	<0.001
	GCS 9 -12	1.68 (1.38 - 2.03)	<0.001
	GCS 6 -8	1.59 (1.39 - 1.82)	<0.001
	GCS 4 -5	1.58 (1.43 - 1.75)	<0.001
	GCS =3	1.41 (1.33 - 1.50)	<0.001
	Not recorded	0.97 (0.90 - 1.05)	0.425
Systolic Blood Pressure	SBP ≥110 mmHg	(Reference)	
	SBP <110 mmHg	1.21 (1.14 - 1.28)	<0.001
	Not recorded	0.58 (0.53 - 0.64)	<0.001
Hospital Designation	TU/NDH	(Reference)	
	MTC	3.18 (3.05 - 3.33)	<0.001

Table 2: Covariates and adjusted odds ratios for having a whole body CT following major trauma. 'CCI' = Charlson comorbidity index; ISS = injury severity score; MOI = mechanism of injury.

There was a wide variation in both the unadjusted and adjusted odds of having a WBCT between individual hospitals within each hospital category (MTCs and TUs/NDHs) (Appendix 1 and Figure 1). For MTCs, the adjusted odds ratio for having a WBCT ranged from 0.39 (95% CI 0.32 – 0.47) to 5.07 (95% CI 4.49 – 5.73), a 13-fold increase in odds between the MTC with the lowest usage compared to that with the highest. For TUs and NDHs, the adjusted odds ratio for having a WBCT ranged from 0.22 (95% CI 0.10 – 0.49) to 6.78 (95% CI 4.61 – 9.97). The proportion of intra-class variability in whole body CT rates not accounted for by observed patient characteristics (the covariates included in the multivariate model) was 26% (95% CI 17% - 39%) for MTCs and 17% (95% confidence intervals 13% - 21%) for TUs. Appendix 2 lists the proportions of patients in each hospital who had WBCT, as well as the intra-hospital distribution of the covariates used in the multivariate model.

Exclusion of data from hospitals with data completeness of 50% or less for any given year of the study resulted in no significant difference in intra-hospital variance or the differences between MTCs and TUs/NDHs.

Discussion

This paper demonstrated a large difference in the use of WBCT comparing MTCs to TUs and NDHs. There was also a wide variation in the use of WBCT between individual trauma-receiving hospitals, which needs further investigation.

While there is limited research on the use of WBCT for major trauma in the UK, international studies have reported wide variations its use in other countries. Hsaio et al found that 9.3% of trauma activations in one major trauma centre in New South Wales had WBCT, compared to 32% of German patients with an ISS of >15 and 85% of trauma patients admitted to the Karolinska level 1 trauma centre in Sweden (2, 7, 13). However, these differences in WBCT usage were confounded by the differences in the samples used in different papers. For example, Leidner's study from Sweden included all multiple trauma patients admitted to their Level 2 trauma centre, while Huber-Wagner's paper only included patients with an ISS of >15.

MTCs used WBCT more than TUs, even after adjusting for demographic variables, injury severity, physiological factors and injury mechanism. It is not clear whether this indicates an overuse of WBCT by MTCs, or an underuse of WBCT at TUs. Opinions on the optimal use of WBCT to detect occult injuries are divided, with some authors suggesting that protocol based criteria for ordering WBCT in trauma patients increase the detection of unsuspected injuries, while others found no increase in identification of previously unsuspected injuries with the implementation of similar protocols (17, 18).

The multivariate model identified several factors affecting the use of WBCT. Older women were less likely to have WBCT than older men, but paradoxically women of childbearing age were more likely to have this investigation than men of the same age or older women. This may reflect a gender bias against older female trauma victims, similar to that seen in other acute conditions, such as myocardial infarction and stroke (19, 20).

Appropriately, there was an increased likelihood of having a WBCT with increasing ISS, decreasing GCS and lower SBP in our study. The increased use of WBCT in patients with comorbidities is also reassuring; these patients are likely to do worse than those without comorbidities after major trauma, and the presence of comorbidities may make them more difficult to assess (21, 22). In light of this, the more liberal use of non-invasive investigations such as WBCT is likely to be beneficial in this group.

The increased likelihood of having a WBCT after a road traffic collision compared to a low fall might initially seem appropriate. However, low falls are the commonest and most lethal form of injury in older people, with a high risk of sustaining serious injuries (23, 24). While older patients predominantly sustain injuries to the head and spine after low falls, previous research suggests that they are also at higher risk of injuries to other body regions, supporting the need for more widespread imaging in these patients (24, 25). In our study, among patients with ISS >15 the rate of polytrauma was similar between patients with low falls and those with high energy impact mechanisms (68.3% vs 71.3%, respectively). It is possible that the low use of WBCT may have increased the rate of missed injuries in these patients.

There was significant variation in the use of WBCT between individual hospitals. Much of this was explained by risk factors included in multivariate analysis, but some correlations (for with gender and injury mechanism) may reflect biases in the management of trauma patients rather than decisions based on best practice. In addition, the degree of intra-hospital variance in WBCT use was extremely high and requires further investigation. In one survey of hospitals in England and Wales, the self-reported frequency of WBCT use in hospitals varied from less than once to more than 6 times per week. Only 41 hospitals (22.3%) had written policies guiding the use of WBCT, and these varied significantly between hospitals (5). Such variations may provide one explanation for the high intra-hospital variability in the use of WBCT found in our study.

While the findings of our study have important implications for the development of guidelines for the use of WBCT in major trauma, there were some limitations. The types of patients included in this study were limited by the TARN inclusion criteria; the study therefore only provided data on the use of WBCT in more seriously injured patients. It is possible that the picture may have been different if all trauma patients were included. Anecdotally, many hospitals use WBCT to facilitate discharge of patients with a serious mechanism of injury, but who appear clinically stable. Differences in WBCT use between patients with different triage categories should be interpreted cautiously, as this was not recorded in a large proportion of patients. In addition, the triage criteria used by different ambulance services differed significantly, and not all patients triaged 'positive' were directly admitted to an MTC. Not all criteria used in current WBCT guidelines could be investigated in this study. The TARN database does not include examination findings (apart from vital signs), but 'severe injury on clinical assessment' is a criterion for WBCT in the RCR and other guidelines (3). Some of the correlations identified in this study (for example triage category, comorbidity score and Glasgow coma score) should also be interpreted with caution, given the relatively high rate of missing data for these parameters. In addition, patients who were intubated and ventilated prior to hospital admission were categorised as 'GCS not recorded' which may have skewed the association between GCS and WBCT. Finally, the inclusion of non-designated hospitals with trauma units may have exaggerated the differences between WBCT use between MTCs and other hospitals, if NDHs were performing significantly less WBCTs than TUs. However a sub-analysis of the rate of WBCT between TUs and NDHs showed that the rate of WBCT in NDHs was higher than in TUs (13% vs 6.2%, respectively), and the rate of WBCT for TUs and NDHs combined (6.6%) was almost identical to the rate of WBCT for TUs alone (6.2%).

This study highlights the need for more standardised algorithms for the use of WBCT, to increase its diagnostic accuracy and improve outcomes in major trauma patients. Further work is currently in progress to identify an evidence based algorithm for this, based on the sensitivity and specificity of a clinical decision tool in diagnosing patients with significant poly-trauma using WBCT. In addition, TARN is also investigating the impact of WBCT on survival in major trauma patients in England and Wales.

Table and Figure Legends:

Table 1: Frequencies of all CT scans and WBCTs for different sub-groups of patients, with unadjusted odds ratios for usage of WBCT. 'CCI' = Charlson comorbidity index; ISS = injury severity score; MOI = mechanism of injury

Table 2: Covariates and adjusted odds ratios for having a whole body CT following major trauma.

Figure 1: Adjusted odds of having a whole body CT for patients admitted directly to a trauma receiving hospital, comparing individual MTCs (above) and TUs/NDHs (below). The Red diamonds (upper graph) and blue dots (lower graph) represent the adjusted odds of having a whole body CT at individual hospitals, compared to an average hospital within the group (the red horizontal line in each graph) The Age/Gender interaction term (Age#Gender) refers to the ratio of odds of having a whole body CT between males and females for each age group. On multivariate analysis, an

interaction was noted between age and gender; younger females were more likely to have a WBCT than males of the same age, while this gender difference was reversed in the older age groups.

Appendix 1: Funnel plot showing the unadjusted odds of having a whole body CT following trauma, for individual hospitals. Upper plots show variance in major trauma centres (MTCs); all patients on the left and patients with ISS ≥16 on the right. Lower plots show variance in trauma units and non-designated hospitals (TUs/NDHs); all patients on the left and patients with ISS ≥16 on the right. Dotted lines on the funnel plots represent the 95% and 99% confidence limits for the unadjusted odds of having a WBCT compared to the average for all hospitals (red horizontal line).

Appendix 2: Proportions of patients in each hospital who had WBCT, with the intra-hospital distribution of the covariates used in the multivariate model. The 7 MTCs with less than 10 patients recorded represent paediatric trauma centres (nominal upper age limit 15 years).

Competing Interests

Role of funding Source: This study received no external funding. TARN is funded by subscription from its member hospitals in England, Wales, Republic of Ireland, Denmark and Switzerland. None of the authors have any competing interests to declare.

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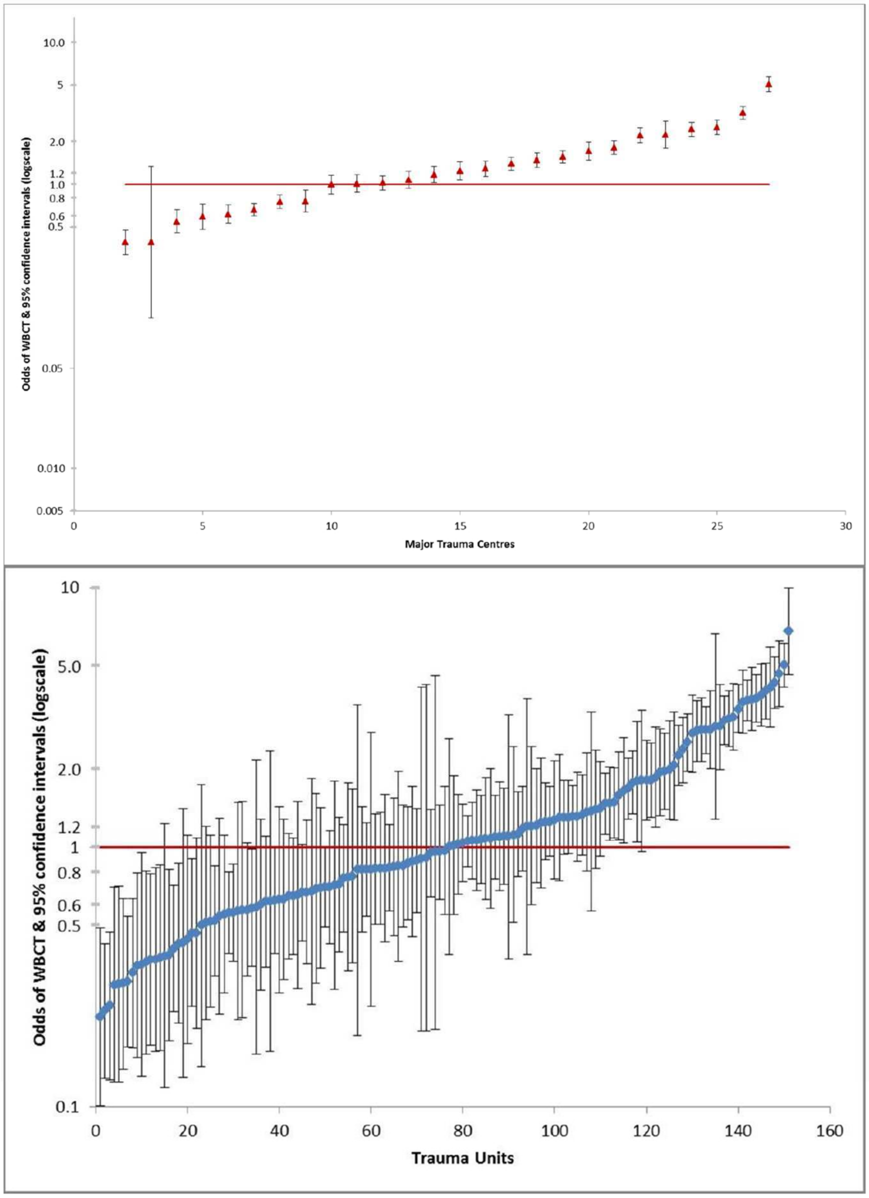
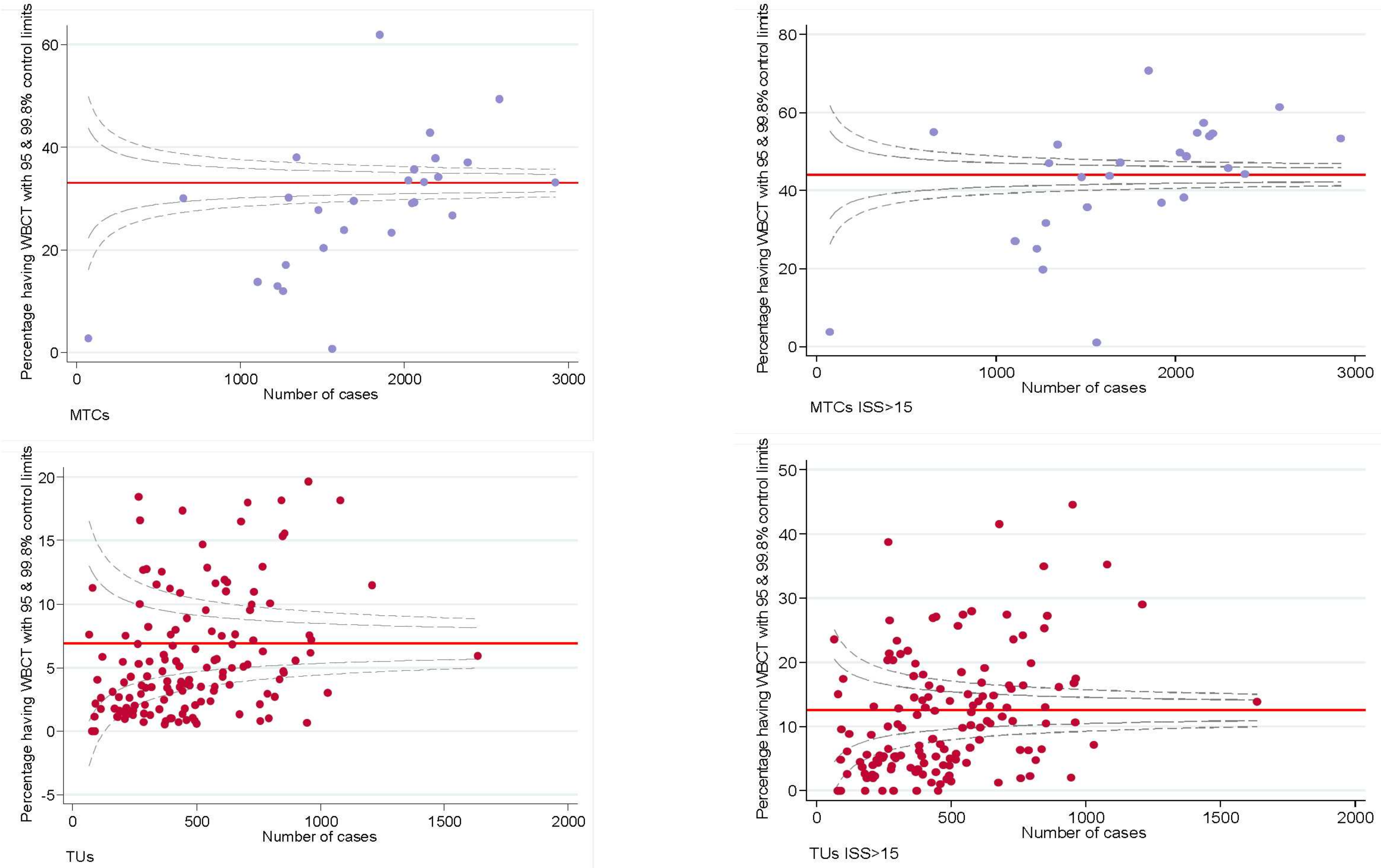


Figure 1: Adjusted odds of having a whole body CT for patients admitted directly to a trauma receiving hospital, comparing individual MTCs (above) and TUs/NDHs (below). The Red diamonds (upper graph) and blue dots (lower graph) represent the adjusted odds of having a whole body CT at individual hospitals, compared to an average hospital within the group (the red horizontal line in each graph) The Age/Gender interaction term (Age#Gender) refers to the ratio of odds of having a whole body CT between males and females for each age group. On multivariate analysis, an interaction was noted between age and gender; younger females were more likely to have a WBCT than males of the same age, while this gender difference was reversed in the older age groups.

Figure 1


Percentage having WBCT with 95 & 99.8% control limits
Number of cases
MTCs
Percentage having WBCT with 95 & 99.8% control limits
Number of cases
MTCs ISS>15
Percentage having WBCT with 95 & 99.8% control limits
Number of cases
TUs
Percentage having WBCT with 95 & 99.8% control limits
Number of cases
TUs ISS>15

Hospital ID	Charlson ≥10	Mechanism: Fall < 2m	Fall ≥ 2m	RTC	Other	ISS 1 to 8	9 to 15	16 to 24	≥25	GCS 15	13 to 14	9 to 12	6 to 8	4 to 5	3	Missing	SBP >=110mmHg	<110mmHg
Hospital 035		60 (75%)	9 (11.3%)	4 (5%)	7 (8.8%)	26 (32.5%)	39 (48.8%)	9 (11.3%)	6 (7.5%)	58 (72.5%)	8 (10%)	2 (2.5%)	1 (1.3%)			11 (13.8%)	74 (92.5%)	6 (7.5%)
Hospital 036	3 (1.2%)	196 (79.7%)	21 (8.5%)	24 (9.8%)	5 (2%)	49 (19.9%)	158 (64.2%)	24 (9.8%)	15 (6.1%)	185 (75.2%)	25 (10.2%)	2 (0.8%)	3 (1.2%)	1 (0.4%)	1 (0.4%)	29 (11.8%)	224 (91.1%)	22 (8.9%)
Hospital 037	12 (4.1%)	212 (72.4%)	20 (6.8%)	36 (12.3%)	25 (8.5%)	63 (21.5%)	174 (59.4%)	28 (9.6%)	28 (9.6%)	246 (84%)	29 (9.9%)	4 (1.4%)	2 (0.7%)		3 (1%)	9 (3.1%)	269 (91.8%)	24 (8.2%)
Hospital 038	2 (0.9%)	151 (68.3%)	26 (11.8%)	35 (15.8%)	9 (4.1%)	64 (29%)	116 (52.5%)	28 (12.7%)	13 (5.9%)	127 (57.5%)	16 (7.2%)	3 (1.4%)	2 (0.9%)	2 (0.9%)	5 (2.3%)	66 (29.9%)	190 (86%)	31 (14%)
Hospital 039	6 (3.6%)	127 (75.1%)	11 (6.5%)	8 (4.7%)	23 (13.6%)	42 (24.9%)	72 (42.6%)	31 (18.3%)	24 (14.2%)	129 (76.3%)	27 (16%)	5 (3%)	1 (0.6%)	1 (0.6%)	4 (2.4%)	2 (1.2%)	150 (88.8%)	19 (11.2%)
Hospital 040	4 (0.7%)	296 (55%)	62 (11.5%)	127 (23.6%)	53 (9.9%)	110 (20.4%)	244 (45.4%)	84 (15.6%)	100 (18.6%)	393 (73%)	66 (12.3%)	17 (3.2%)	16 (3%)	7 (1.3%)	24 (4.5%)	15 (2.8%)	462 (85.9%)	76 (14.1%)
Hospital 041	45 (6.1%)	455 (62.2%)	81 (11.1%)	140 (19.1%)	56 (7.7%)	147 (20.1%)	377 (51.5%)	106 (14.5%)	102 (13.9%)	576 (78.7%)	94 (12.8%)	15 (2%)	13 (1.8%)	5 (0.7%)	13 (1.8%)	16 (2.2%)	664 (90.7%)	68 (9.3%)
Hospital 042	160 (7%)	1402 (61.1%)	227 (9.9%)	449 (19.6%)	217 (9.5%)	474 (20.7%)	994 (43.3%)	434 (18.9%)	393 (17.1%)	1655 (72.1%)	307 (13.4%)	89 (3.9%)	46 (2%)	24 (1%)	55 (2.4%)	119 (5.2%)	2107 (91.8%)	188 (8.2%)
Hospital 043	2 (0.5%)	300 (76.7%)	32 (8.2%)	31 (7.9%)	28 (7.2%)	76 (19.4%)	184 (47.1%)	77 (19.7%)	54 (13.8%)	338 (86.4%)	36 (9.2%)	6 (1.5%)	6 (1.5%)		5 (1.3%)		349 (89.3%)	42 (10.7%)
Hospital 044		100 (88.5%)	4 (3.5%)	6 (5.3%)	3 (2.7%)	33 (29.2%)	41 (36.3%)	23 (20.4%)	16 (14.2%)	74 (65.5%)	25 (22.1%)	4 (3.5%)				10 (8.8%)	103 (91.2%)	10 (8.8%)
Hospital 045	5 (2.5%)	140 (69.3%)	24 (11.9%)	17 (8.4%)	21 (10.4%)	30 (14.9%)	126 (62.4%)	27 (13.4%)	19 (9.4%)	78 (38.6%)	20 (9.9%)	1 (0.5%)	2 (1%)	2 (1%)	3 (1.5%)	96 (47.5%)	174 (86.1%)	28 (13.9%)
Hospital 046	11 (1.5%)	481 (66.5%)	94 (13%)	107 (14.8%)	41 (5.7%)	187 (25.9%)	377 (52.1%)	103 (14.2%)	56 (7.7%)	538 (74.4%)	91 (12.6%)	22 (3%)	11 (1.5%)	3 (0.4%)	7 (1%)	51 (7.1%)	662 (91.6%)	61 (8.4%)
Hospital 047	19 (2%)	500 (52.5%)	176 (18.5%)	158 (16.6%)	118 (12.4%)	232 (24.4%)	518 (54.4%)	128 (13.4%)	74 (7.8%)	781 (82%)	80 (8.4%)	31 (3.3%)	5 (0.5%)	2 (0.2%)	28 (2.9%)	25 (2.6%)	839 (88.1%)	113 (11.9%)
Hospital 048		157 (72.4%)	25 (11.5%)	28 (12.9%)	7 (3.2%)	80 (36.9%)	92 (42.4%)	31 (14.3%)	14 (6.5%)	161 (74.2%)	13 (6%)	2 (0.9%)		2 (0.9%)	1 (0.5%)	38 (17.5%)	201 (92.6%)	16 (7.4%)
Hospital 049	4 (2.2%)	128 (71.5%)	20 (11.2%)	12 (6.7%)	19 (10.6%)	40 (22.3%)	101 (56.4%)	22 (12.3%)	16 (8.9%)	144 (80.4%)	19 (10.6%)	4 (2.2%)	1 (0.6%)	2 (1.1%)	4 (2.2%)	5 (2.8%)	159 (88.8%)	20 (11.2%)
Hospital 050	19 (1.3%)	723 (48.9%)	173 (11.7%)	458 (31%)	124 (8.4%)	251 (17%)	553 (37.4%)	296 (20%)	378 (25.6%)	913 (61.8%)	272 (18.4%)	85 (5.8%)	53 (3.6%)	35 (2.4%)	80 (5.4%)	40 (2.7%)	1264 (85.5%)	214 (14.5%)
Hospital 051	17 (3.8%)	268 (60.4%)	52 (11.7%)	89 (20%)	35 (7.9%)	97 (21.8%)	207 (46.6%)	83 (18.7%)	57 (12.8%)	336 (75.7%)	58 (13.1%)	15 (3.4%)	9 (2%)	1 (0.2%)	9 (2%)	16 (3.6%)	374 (84.2%)	70 (15.8%)
Hospital 052	3 (1.2%)	145 (55.8%)	34 (13.1%)	60 (23.1%)	21 (8.1%)	77 (29.6%)	124 (47.7%)	39 (15%)	20 (7.7%)	193 (74.2%)	34 (13.1%)	7 (2.7%)	2 (0.8%)	1 (0.4%)	3 (1.2%)	20 (7.7%)	223 (85.8%)	37 (14.2%)
Hospital 053	3 (3%)	55 (55.6%)	10 (10.1%)	32 (32.3%)	2 (2%)	20 (20.2%)	56 (56.6%)	17 (17.2%)	6 (6.1%)	82 (82.8%)	11 (11.1%)	3 (3%)	1 (1%)	1 (1%)		1 (1%)	89 (89.9%)	10 (10.1%)
Hospital 054		3 (75%)	1 (25%)			1 (25%)		2 (50%)	1 (25%)	3 (75%)	1 (25%)						4 (100%)	
Hospital 055	4 (2.2%)	122 (67.4%)	16 (8.8%)	31 (17.1%)	12 (6.6%)	48 (26.5%)	111 (61.3%)	13 (7.2%)	9 (5%)	146 (80.7%)	4 (2.2%)		1 (0.6%)			30 (16.6%)	160 (88.4%)	21 (11.6%)
Hospital 056		6 (100%)				2 (33.3%)	3 (50%)	1 (16.7%)		4 (66.7%)						2 (33.3%)	5 (83.3%)	1 (16.7%)
Hospital 057	3 (1%)	209 (66.3%)	46 (14.6%)	39 (12.4%)	21 (6.7%)	76 (24.1%)	177 (56.2%)	34 (10.8%)	28 (8.9%)	245 (77.8%)	25 (7.9%)	9 (2.9%)	4 (1.3%)	1 (0.3%)	2 (0.6%)	29 (9.2%)	285 (90.5%)	30 (9.5%)
Hospital 058	4 (1.9%)	131 (63%)	19 (9.1%)	31 (14.9%)	27 (13%)	38 (18.3%)	94 (45.2%)	38 (18.3%)	38 (18.3%)	157 (75.5%)	35 (16.8%)	4 (1.9%)	2 (1%)		2 (1%)	8 (3.8%)	180 (86.5%)	28 (13.5%)
Hospital 059	6 (1.9%)	195 (61.3%)	32 (10.1%)	64 (20.1%)	27 (8.5%)	75 (23.6%)	160 (50.3%)	47 (14.8%)	36 (11.3%)	267 (84%)	24 (7.5%)	7 (2.2%)	4 (1.3%)		3 (0.9%)	13 (4.1%)	279 (87.7%)	39 (12.3%)
Hospital 060	14 (2%)	418 (60.7%)	80 (11.6%)	142 (20.6%)	49 (7.1%)	142 (20.6%)	347 (50.4%)	102 (14.8%)	98 (14.2%)	555 (80.6%)	70 (10.2%)	19 (2.8%)	9 (1.3%)	2 (0.3%)	10 (1.5%)	24 (3.5%)	617 (89.6%)	72 (10.4%)
Hospital 061	11 (0.7%)	755 (46.3%)	196 (12%)	457 (28%)	223 (13.7%)	382 (23.4%)	713 (43.7%)	289 (17.7%)	247 (15.1%)	1267 (77.7%)	133 (8.2%)	64 (3.9%)	30 (1.8%)	18 (1.1%)	52 (3.2%)	67 (4.1%)	1421 (87.1%)	210 (12.9%)
Hospital 062	10 (2.3%)	290 (66.1%)	58 (13.2%)	71 (16.2%)	20 (4.6%)	89 (20.3%)	236 (53.8%)	49 (11.2%)	65 (14.8%)	318 (72.4%)	32 (7.3%)	11 (2.5%)	8 (1.8%)	8 (1.8%)	4 (0.9%)	58 (13.2%)	409 (93.2%)	30 (6.8%)
Hospital 063	235 (10.6%)	1038 (47%)	303 (13.7%)	668 (30.3%)	198 (9%)	382 (17.3%)	938 (42.5%)	418 (18.9%)	469 (21.3%)	1502 (68.1%)	341 (15.5%)	93 (4.2%)	60 (2.7%)	19 (0.9%)	80 (3.6%)	112 (5.1%)	1966 (89.1%)	241 (10.9%)
Hospital 064	6 (2.1%)	252 (87.5%)	13 (4.5%)	17 (5.9%)	6 (2.1%)	121 (42%)	110 (38.2%)	37 (12.8%)	20 (6.9%)	238 (82.6%)	14 (4.9%)			1 (0.3%)		35 (12.2%)	267 (92.7%)	21 (7.3%)
Hospital 065	63 (2.9%)	422 (19.6%)	462 (21.4%)	852 (39.5%)	422 (19.6%)	249 (11.5%)	762 (35.3%)	533 (24.7%)	614 (28.5%)	1291 (59.8%)	374 (17.3%)	193 (8.9%)	119 (5.5%)	48 (2.2%)	111 (5.1%)	22 (1%)	1807 (83.7%)	351 (16.3%)
Hospital 066		5 (55.6%)	1 (11.1%)		3 (33.3%)	3 (33.3%)	4 (44.4%)		2 (22.2%)	8 (88.9%)	1 (11.1%)						7 (77.8%)	2 (22.2%)
Hospital 067	23 (5.3%)	260 (60.5%)	58 (13.5%)	70 (16.3%)	42 (9.8%)	127 (29.5%)	178 (41.4%)	65 (15.1%)	60 (14%)	322 (74.9%)	69 (16%)	10 (2.3%)	8 (1.9%)	6 (1.4%)	10 (2.3%)	5 (1.2%)	383 (89.1%)	47 (10.9%)
Hospital 068	23 (5%)	317 (69.4%)	45 (9.8%)	65 (14.2%)	30 (6.6%)	117 (25.6%)	215 (47%)	68 (14.9%)	57 (12.5%)	349 (76.4%)	61 (13.3%)	18 (3.9%)	8 (1.8%)	4 (0.9%)	9 (2%)	8 (1.8%)	409 (89.5%)	48 (10.5%)
Hospital 069	4 (17.4%)	20 (87%)		3 (13%)		15 (65.2%)	1 (4.3%)	4 (17.4%)	3 (13%)	5 (21.7%)	1 (4.3%)					17 (73.9%)	23 (100%)	
Hospital 070	8 (1.1%)	514 (68.2%)	52 (6.9%)	120 (15.9%)	68 (9%)	201 (26.7%)	380 (50.4%)	96 (12.7%)	77 (10.2%)	627 (83.2%)	62 (8.2%)	13 (1.7%)	5 (0.7%)	6 (0.8%)	16 (2.1%)	25 (3.3%)	688 (91.2%)	66 (8.8%)
Hospital 071	31 (4.4%)	437 (61.8%)	107 (15.1%)	129 (18.2%)	34 (4.8%)	155 (21.9%)	344 (48.7%)	102 (14.4%)	106 (15%)	538 (76.1%)	97 (13.7%)	26 (3.7%)	16 (2.3%)	5 (0.7%)	14 (2%)	11 (1.6%)	634 (89.7%)	73 (10.3%)
Hospital 072	16 (2.6%)	390 (62.6%)	56 (9%)	121 (19.4%)	56 (9%)	220 (35.3%)	272 (43.7%)	67 (10.8%)	64 (10.3%)	494 (79.3%)	56 (9%)	11 (1.8%)	4 (0.6%)	3 (0.5%)	5 (0.8%)	50 (8%)	570 (91.5%)	53 (8.5%)
Hospital 073	9 (1.5%)	374 (61.6%)	61 (10%)	101 (16.6%)	71 (11.7%)	145 (23.9%)	309 (50.9%)	93 (15.3%)	60 (9.9%)	480 (79.1%)	46 (7.6%)	14 (2.3%)	6 (1%)	2 (0.3%)	6 (1%)	53 (8.7%)	536 (88.3%)	71 (11.7%)
Hospital 074	19 (6.9%)	127 (45.8%)	82 (29.6%)	35 (12.6%)	33 (11.9%)	49 (17.7%)	138 (49.8%)	49 (17.7%)	41 (14.8%)	216 (78%)	41 (14.8%)	7 (2.5%)	3 (1.1%)		2 (0.7%)	8 (2.9%)	244 (88.1%)	33 (11.9%)
Hospital 075	50 (4.6%)	552 (51.1%)	152 (14.1%)	249 (23%)	128 (11.8%)	192 (17.8%)	550 (50.9%)	172 (15.9%)	167 (15.4%)	855 (79.1%)	113 (10.5%)	35 (3.2%)	9 (0.8%)	11 (1%)	45 (4.2%)	13 (1.2%)	928 (85.8%)	153 (14.2%)
Hospital 076	5 (4.4%)	90 (78.9%)	8 (7%)	11 (9.6%)	5 (4.4%)	28 (24.6%)	53 (46.5%)	16 (14%)	17 (14.9%)	84 (73.7%)	23 (20.2%)	3 (2.6%)		1 (0.9%)		3 (2.6%)	106 (93%)	8 (7%)
Hospital 077	1 (0.5%)	135 (63.4%)	22 (10.3%)	43 (20.2%)	13 (6.1%)	57 (26.8%)	95 (44.6%)	24 (11.3%)	37 (17.4%)	172 (80.8%)	15 (7%)	8 (3.8%)	1 (0.5%)	1 (0.5%)	3 (1.4%)	13 (6.1%)	204 (95.8%)	9 (4.2%)
Hospital 078	5 (1.8%)	170 (62.7%)	29 (10.7%)	42 (15.5%)	30 (11.1%)	61 (22.5%)	142 (52.4%)	43 (15.9%)	25 (9.2%)	203 (74.9%)	24 (8.9%)	6 (2.2%)	3 (1.1%)	1 (0.4%)	5 (1.8%)	29 (10.7%)	236 (87.1%)	35 (12.9%)
Hospital 079	13 (3.1%)	239 (57.6%)	60 (14.5%)	74 (17.8%)	42 (10.1%)	100 (24.1%)	205 (49.4%)	57 (13.7%)	53 (12.8%)	320 (77.1%)	49 (11.8%)	8 (1.9%)	4 (1%)	2 (0.5%)	8 (1.9%)	24 (5.8%)	355 (85.5%)	60 (14.5%)
Hospital 080	16 (1.9%)	538 (63.1%)	77 (9%)	174 (20.4%)	64 (7.5%)	227 (26.6%)	377 (44.2%)	144 (16.9%)	105 (12.3%)	650 (76.2%)	113 (13.2%)	31 (3.6%)	9 (1.1%)	5 (0.6%)	17 (2%)	28 (3.3%)	759 (89%)	94 (11%)
Hospital 081	39 (1.3%)	1378 (47.1%)	386 (13.2%)	940 (32.2%)	219 (7.5%)	534 (18.3%)	1235 (42.3%)	574 (19.6%)	580 (19.8%)	2280 (78%)	346 (11.8%)	96 (3.3%)	44 (1.5%)	36 (1.2%)	76 (2.6%)	45 (1.5%)	2566 (87.8%)	357 (12.2%)
Hospital 082	5 (1.8%)	170 (60.7%)	29 (10.4%)	40 (14.3%)	41 (14.6%)	59 (21.1%)	142 (50.7%)	44 (15.7%)	35 (12.5%)	246 (87.9%)	10 (3.6%)	2 (0.7%)	1 (0.4%)		4 (1.4%)	17 (6.1%)	251 (89.6%)	29 (10.4%)
Hospital 083		23 (46.9%)	8 (16.3%)	5 (10.2%)	13 (26.5%)	12 (24.5%)	23 (46.9%)	10 (20.4%)	4 (8.2%)	38 (77.6%)	4 (8.2%)	3 (6.1%)				4 (8.2%)	43 (87.8%)	6 (12.2%)
Hospital 084	12 (2.8%)	294 (68.9%)	49 (11.5%)	58 (13.6%)	26 (6.1%)	125 (29.3%)	218 (51.1%)	51 (11.9%)	33 (7.7%)	354 (82.9%)	28 (6.6%)	6 (1.4%)	3 (0.7%)	4 (0.9%)	11 (2.6%)	21 (4.9%)	367 (85.9%)	60 (14.1%)
Hospital 085	19 (3.3%)	336 (58.7%)	55 (9.6%)	108 (18.9%)	73 (12.8%)	115 (20.1%)	300 (52.4%)	67 (11.7%)	90 (15.7%)	434 (75.9%)	60 (10.5%)	23 (4%)	9 (1.6%)	4 (0.7%)	14 (2.4%)	28 (4.9%)	493 (86.2%)	79 (13.8%)
Hospital 086					1 (100%)			1 (100%)		1 (100%)							1 (100%)	
Hospital 087	8 (1.6%)	388 (77.6%)	18 (3.6%)	41 (8.2%)	53 (10.6%)	129 (25.8%)	232 (46.4%)	74 (14.8%)	65 (13%)	367 (73.4%)	47 (9.4%)	11 (2.2%)	6 (1.2%)		3 (0.6%)	66 (13.2%)	467 (93.4%)	33 (6.6%)
Hospital 088	7 (1.5%)	318 (66.8%)	54 (11.3%)	52 (10.9%)	52 (10.9%)	104 (21.8%)	294 (61.8%)	39 (8.2%)	39 (8.2%)	410 (86.1%)	32 (6.7%)	12 (2.5%)	2 (0.4%)	2 (0.4%)	4 (0.8%)	14 (2.9%)	416 (87.4%)	60 (12.6%)
Hospital 089	100 (6.1%)	1076 (65.8%)	137 (8.4%)	327 (20%)	96 (5.9%)	385 (23.5%)	781 (47.7%)	249 (15.2%)	221 (13.5%)	1213 (74.1%)	189 (11.6%)	62 (3.8%)	20 (1.2%)	11 (0.7%)	22 (1.3%)	119 (7.3%)	1488 (91%)	148 (9%)
Hospital 090	9 (2.6%)	265 (75.9%)	40 (11.5%)	27 (7.7%)	17 (4.9%)	103 (29.5%)	189 (54.2%)	35 (10%)	22 (6.3%)	305 (87.4%)	18 (5.2%)	5 (1.4%)	4 (1.1%)	1 (0.3%)	5 (1.4%)	11 (3.2%)	311 (89.1%)	38 (10.9%)
Hospital 091	1 (0.3%)	288 (76.4%)	20 (5.3%)	43 (11.4%)	26 (6.9%)	95 (25.2%)	222 (58.9%)	38 (10.1%)	22 (5.8%)	312 (82.8%)	40 (10.6%)	11 (2.9%)		1 (0.3%)	3 (0.8%)	10 (2.7%)	333 (88.3%)	44 (11.7%)
Hospital 092	2 (0.3%)	355 (61.7%)	39 (6.8%)	104 (18.1%)	77 (13.4%)	105 (18.3%)	347 (60.3%)	62 (10.8%)	61 (10.6%)	480 (83.5%)	36 (6.3%)	15 (2.6%)	9 (1.6%)	7 (1.2%)	9 (1.6%)	19 (3.3%)	526 (91.5%)	49 (8.5%)
Hospital 093	4 (0.7%)	338 (62.1%)	47 (8.6%)	119 (21.9%)	40 (7.4%)	131 (24.1%)	267 (49.1%)	73 (13.4%)	73 (13.4%)	431 (79.2%)	49 (9%)	10 (1.8%)	7 (1.3%)	6 (1.1%)	10 (1.8%)	31 (5.7%)	504 (92.6%)	40 (7.4%)
Hospital 094	89 (9.2%)	604 (62.7%)	159 (16.5%)	129 (13.4%)	71 (7.4%)	238 (24.7%)	490 (50.9%)	124 (12.9%)	111 (11.5%)	728 (75.6%)	140 (14.5%)	25 (2.6%)	16 (1.7%)	8 (0.8%)	14 (1.5%)	32 (3.3%)	858 (89.1%)	105 (10.9%)
Hospital 095	3 (0.8%)	294 (74.2%)	18 (4.5%)	62 (15.7%)	22 (5.6%)	96 (24.2%)	206 (52%)	63 (15.9%)	31 (7.8%)	345 (87.1%)	23 (5.8%)	7 (1.8%)	2 (0.5%)	3 (0.8%)	4 (1%)	12 (3%)	360 (90.9%)	36 (9.1%)
Hospital 096	38 (5%)	531 (69.3%)	55 (7.2%)	131 (17.1%)	49 (6.4%)	204 (26.6%)	376 (49.1%)	108 (14.1%)	78 (10.2%)	592 (77.3%)	95 (12.4%)	21 (2.7%)	13 (1.7%)	3 (0.4%)	11 (1.4%)	31 (4%)	703 (91.8%)	63 (8.2%)
Hospital 097	11 (2.1%)	322 (61.9%)	79 (15.2%)	75 (14.4%)	44 (8.5%)	142 (27.3%)	255 (49%)	67 (12.9%)	56 (10.8%)	444 (85.4%)	35 (6.7%)	8 (1.5%)	10 (1.9%)	8 (1.5%)	15 (2.9%)		483 (92.9%)	37 (7.1%)
Hospital 098	1 (1.1%)	63 (68.5%)	7 (7.6%)	16 (17.4%)	6 (6.5%)	26 (28.3%)	45 (48.9%)	10 (10.9%)	11 (12%)	68 (73.9%)	11 (12%)	2 (2.2%)		1 (1.1%)	1 (1.1%)	9 (9.8%)	82 (89.1%)	10 (10.9%)
Hospital 099	7 (0.8%)	564 (62.7%)	155 (17.2%)	129 (14.3%)	52 (5.8%)	163 (18.1%)	551 (61.2%)	113 (12.6%)	73 (8.1%)	691 (76.8%)	95 (10.6%)	21 (2.3%)	9 (1%)	3 (0.3%)	10 (1.1%)	71 (7.9%)	818 (90.9%)	82 (9.1%)
Hospital 100	27 (6.3%)	337 (78%)	33 (7.6%)	42 (9.7%)	20 (4.6%)	128 (29.6%)	217 (50.2%)	61 (14.1%)	26 (6%)	354 (81.9%)	34 (7.9%)	8 (1.9%)	1 (0.2%)		1 (0.2%)	34 (7.9%)	395 (91.4%)	37 (8.6%)
Hospital 101	17 (2.4%)	492 (68.7%)	76 (10.6%)	98 (13.7%)	50 (7%)	170 (23.7%)	332 (46.4%)	114 (15.9%)	100 (14%)	518 (72.3%)	95 (13.3%)	25 (3.5%)	12 (1.7%)	9 (1.3%)	18 (2.5%)	39 (5.4%)	656 (91.6%)	60 (8.4%)
Hospital 102	35 (5.4%)	454 (70.3%)	58 (9%)	82 (12.7%)	52 (8%)	155 (24%)	290 (44.9%)	111 (17.2%)	90 (13.9%)	461 (71.4%)	107 (16.6%)	20 (3.1%)	6 (0.9%)	1 (0.2%)	17 (2.6%)	34 (5.3%)	582 (90.1%)	64 (9.9%)
Hospital 103	4 (0.5%)	503 (66.4%)	114 (15%)	72 (9.5%)	69 (9.1%)	215 (28.4%)	383 (50.5%)	75 (9.9%)	85 (11.2%)	616 (81.3%)	65 (8.6%)	17 (2.2%)	8 (1.1%)	3 (0.4%)	13 (1.7%)	36 (4.7%)	693 (91.4%)	65 (8.6%)
Hospital 104	37 (3.1%)	850 (70.3%)	107 (8.9%)	175 (14.5%)	77 (6.4%)	337 (27.9%)	589 (48.7%)	138 (11.4%)	145 (12%)	958 (79.2%)	124 (10.3%)	34 (2.8%)	12 (1%)	9 (0.7%)	32 (2.6%)	40 (3.3%)	1088 (90%)	121 (10%)
Hospital 105	18 (5.8%)	265 (84.7%)	17 (5.4%)	14 (4.5%)	17 (5.4%)	76 (24.3%)	182 (58.1%)	27 (8.6%)	28 (8.9%)	248 (79.2%)	25 (8%)	6 (1.9%)	2 (0.6%)		5 (1.6%)	27 (8.6%)	286 (91.4%)	27 (8.6%)
Hospital 106	4 (0.9%)	332 (72.5%)	58 (12.7%)	41 (9%)	27 (5.9%)	129 (28.2%)	228 (49.8%)	59 (12.9%)	42 (9.2%)	387 (84.5%)	34 (7.4%)	11 (2.4%)	2 (0.4%)		6 (1.3%)	18 (3.9%)	400 (87.3%)	58 (12.7%)
Hospital 107	20 (5.6%)	261 (72.7%)	35 (9.7%)	39 (10.9%)	24 (6.7%)	93 (25.9%)	154 (42.9%)	61 (17%)	51 (14.2%)	283 (78.8%)	38 (10.6%)	10 (2.8%)	5 (1.4%)		5 (1.4%)	18 (5%)	320 (89.1%)	39 (10.9%)
Hospital 108	8 (1.9%)	208 (48.1%)	75 (17.4%)	103 (23.8%)	46 (10.6%)	70 (16.2%)	269 (62.3%)	55 (12.7%)	38 (8.8%)	372 (86.1%)	39 (9%)	10 (2.3%)	5 (1.2%)	2 (0.5%)	3 (0.7%)	1 (0.2%)	388 (89.8%)	44 (10.2%)
Hospital 109	8 (0.3%)	265 (11.1%)	512 (21.4%)	1025 (42.9%)	585 (24.5%)	227 (9.5%)	728 (30.5%)	565 (23.7%)	867 (36.3%)	1277 (53.5%)	384 (16.1%)	210 (8.8%)	162 (6.8%)	86 (3.6%)	185 (7.8%)	83 (3.5%)	1947 (81.6%)	440 (18.4%)
Hospital 110	40 (5.9%)	450 (66.8%)	97 (14.4%)	83 (12.3%)	44 (6.5%)	148 (22%)	359 (53.3%)	93 (13.8%)	74 (11%)	568 (84.3%)	61 (9.1%)	15 (2.2%)	5 (0.7%)	2 (0.3%)	4 (0.6%)	19 (2.8%)	605 (89.8%)	69 (10.2%)
Hospital 111	24 (2.8%)	477 (56.3%)	107 (12.6%)	190 (22.4%)	73 (8.6%)	219 (25.9%)	320 (37.8%)	159 (18.8%)	149 (17.6%)	624 (73.7%)	112 (13.2%)	35 (4.1%)	18 (2.1%)	7 (0.8%)	26 (3.1%)	25 (3%)	746 (88.1%)	101 (11.9%)
Hospital 112	52 (4.1%)	638 (50.5%)	217 (17.2%)	201 (15.9%)	207 (16.4%)	243 (19.2%)	648 (51.3%)	211 (16.7%)	161 (12.7%)	1027 (81.3%)	171 (13.5%)	26 (2.1%)	7 (0.6%)	1 (0.1%)	25 (2%)	6 (0.5%)	1108 (87.7%)	155 (12.3%)

Hospital ID	MTC/TU	Direct patients	CT Scan Usage: Had CT	Had WBCT	Age: 16 - 44 yr	45 - 54 yrs	55 - 64 yrs	65 - 75yrs	>75 yr	Gender: Male	Female	Charlson Comorbidity Score: 0	1 to 5	6 to 10	≥10	Mechanism of Injury: Fall < 2m	Fall ≥ 2m	RTC	Other	Injury Severity Score: 1 to 8	9 to 15	16 to 24	≥25	Glasgow Coma Score: 15	13 to 14	9 to 12	6 to 8	4 to 5	3	Missing	Systolic Blood Pressure: >=110mmHg	<110mmHg
Hospital 113	TU	838	535 (63.8%)	35 (4.2%)	173 (20.6%)	105 (12.5%)	137 (16.3%)	96 (11.5%)	327 (39%)	437 (52.1%)	401 (47.9%)	545 (65%)	236 (28.2%)	38 (4.5%)	19 (2.3%)	505 (60.3%)	132 (15.8%)	146 (17.4%)	55 (6.6%)	178 (21.2%)	426 (50.8%)	131 (15.6%)	103 (12.3%)	666 (79.5%)	107 (12.8%)	23 (2.7%)	16 (1.9%)	4 (0.5%)	19 (2.3%)	3 (0.4%)	739 (88.2%)	99 (11.8%)
Hospital 114	TU	36	13 (36.1%)	9 (25%)	13 (36.1%)	10 (27.8%)	7 (19.4%)	3 (8.3%)	3 (8.3%)	26 (72.2%)	10 (27.8%)	14 (38.9%)	22 (61.1%)			7 (19.4%)	7 (19.4%)	13 (36.1%)	9 (25%)	6 (16.7%)	10 (27.8%)	10 (27.8%)	10 (27.8%)	15 (41.7%)	5 (13.9%)	2 (5.6%)	2 (5.6%)	1 (2.8%)	9 (25%)	2 (5.6%)	27 (75%)	9 (25%)
Hospital 115	MTC	1295	902 (69.7%)	391 (30.2%)	438 (33.8%)	207 (16%)	226 (17.5%)	160 (12.4%)	264 (20.4%)	779 (60.2%)	516 (39.8%)	671 (51.8%)	576 (44.5%)	30 (2.3%)	18 (1.4%)	456 (35.2%)	280 (21.6%)	405 (31.3%)	154 (11.9%)	211 (16.3%)	539 (41.6%)	266 (20.5%)	279 (21.5%)	888 (68.6%)	167 (12.9%)	76 (5.9%)	54 (4.2%)	21 (1.6%)	56 (4.3%)	33 (2.5%)	1129 (87.2%)	166 (12.8%)
Hospital 116	TU	707	380 (53.7%)	37 (5.2%)	135 (19.1%)	112 (15.8%)	152 (21.5%)	86 (12.2%)	222 (31.4%)	361 (51.1%)	346 (48.9%)	319 (45.1%)	348 (49.2%)	22 (3.1%)	18 (2.5%)	462 (65.3%)	96 (13.6%)	68 (9.6%)	81 (11.5%)	171 (24.2%)	412 (58.3%)	66 (9.3%)	58 (8.2%)	593 (83.9%)	64 (9.1%)	12 (1.7%)	13 (1.8%)	2 (0.3%)	13 (1.8%)	10 (1.4%)	615 (87%)	92 (13%)
Hospital 117	TU	645	411 (63.7%)	32 (5%)	121 (18.8%)	65 (10.1%)	89 (13.8%)	73 (11.3%)	297 (46%)	315 (48.8%)	330 (51.2%)	234 (36.3%)	353 (54.7%)	42 (6.5%)	16 (2.5%)	407 (63.1%)	86 (13.3%)	116 (18%)	36 (5.6%)	200 (31%)	308 (47.8%)	88 (13.6%)	49 (7.6%)	485 (75.2%)	83 (12.9%)	14 (2.2%)	3 (0.5%)	2 (0.3%)	6 (0.9%)	52 (8.1%)	596 (92.4%)	49 (7.6%)
Hospital 118	MTC	2061	1592 (77.2%)	603 (29.3%)	589 (28.6%)	275 (13.3%)	325 (15.8%)	269 (13.1%)	603 (29.3%)	1199 (58.2%)	862 (41.8%)	1275 (61.9%)	507 (24.6%)	180 (8.7%)	99 (4.8%)	968 (47%)	321 (15.6%)	559 (27.1%)	213 (10.3%)	249 (12.1%)	888 (43.1%)	394 (19.1%)	530 (25.7%)	1380 (67%)	265 (12.9%)	108 (5.2%)	70 (3.4%)	27 (1.3%)	86 (4.2%)	125 (6.1%)	1789 (86.8%)	272 (13.2%)
Hospital 119	MTC	1509	1190 (78.9%)	306 (20.3%)	496 (32.9%)	194 (12.9%)	241 (16%)	153 (10.1%)	425 (28.2%)	915 (60.6%)	594 (39.4%)	865 (57.3%)	562 (37.2%)	54 (3.6%)	28 (1.9%)	609 (40.4%)	281 (18.6%)	452 (30%)	167 (11.1%)	273 (18.1%)	643 (42.6%)	308 (20.4%)	285 (18.9%)	1086 (72%)	214 (14.2%)	45 (3%)	23 (1.5%)	23 (1.5%)	51 (3.4%)	67 (4.4%)	1313 (87%)	196 (13%)
Hospital 120	MTC	7	5 (71.4%)	0 (0%)	3 (42.9%)		1 (14.3%)		3 (42.9%)	4 (57.1%)	3 (42.9%)	2 (28.6%)	2 (28.6%)	2 (28.6%)	1 (14.3%)	5 (71.4%)			2 (28.6%)	1 (14.3%)	2 (28.6%)	3 (42.9%)	1 (14.3%)	1 (14.3%)						6 (85.7%)	7 (100%)	
Hospital 121	TU	526	354 (67.3%)	77 (14.6%)	149 (28.3%)	83 (15.8%)	72 (13.7%)	54 (10.3%)	168 (31.9%)	328 (62.4%)	198 (37.6%)	314 (59.7%)	160 (30.4%)	39 (7.4%)	13 (2.5%)	198 (37.6%)	79 (15%)	183 (34.8%)	66 (12.5%)	107 (20.3%)	259 (49.2%)	93 (17.7%)	67 (12.7%)	432 (82.1%)	55 (10.5%)	16 (3%)	8 (1.5%)	2 (0.4%)	10 (1.9%)	3 (0.6%)	471 (89.5%)	55 (10.5%)
Hospital 122	MTC	2	2 (100%)	2 (100%)	2 (100%)					1 (50%)	1 (50%)	2 (100%)						2 (100%)				2 (100%)			1 (50%)	1 (50%)					2 (100%)	
Hospital 123	TU	382	244 (63.9%)	15 (3.9%)	53 (13.9%)	37 (9.7%)	69 (18.1%)	41 (10.7%)	182 (47.6%)	159 (41.6%)	223 (58.4%)	134 (35.1%)	122 (31.9%)	81 (21.2%)	45 (11.8%)	298 (78%)	37 (9.7%)	18 (4.7%)	29 (7.6%)	108 (28.3%)	188 (49.2%)	50 (13.1%)	36 (9.4%)	281 (73.6%)	37 (9.7%)	10 (2.6%)	1 (0.3%)		8 (2.1%)	45 (11.8%)	323 (84.6%)	59 (15.4%)
Hospital 124	MTC	2121	1450 (68.4%)	703 (33.1%)	606 (28.6%)	281 (13.2%)	301 (14.2%)	240 (11.3%)	693 (32.7%)	1179 (55.6%)	942 (44.4%)	1287 (60.7%)	550 (25.9%)	203 (9.6%)	81 (3.8%)	1005 (47.4%)	286 (13.5%)	652 (30.7%)	178 (8.4%)	426 (20.1%)	885 (41.7%)	378 (17.8%)	432 (20.4%)	1512 (71.3%)	282 (13.3%)	83 (3.9%)	39 (1.8%)	26 (1.2%)	76 (3.6%)	103 (4.9%)	1877 (88.5%)	244 (11.5%)
Hospital 125	TU	1030	495 (48.1%)	31 (3%)	129 (12.5%)	85 (8.3%)	139 (13.5%)	150 (14.6%)	527 (51.2%)	457 (44.4%)	573 (55.6%)	490 (47.6%)	363 (35.2%)	146 (14.2%)	31 (3%)	858 (83.3%)	52 (5%)	83 (8.1%)	37 (3.6%)	349 (33.9%)	441 (42.8%)	123 (11.9%)	117 (11.4%)	916 (88.9%)	70 (6.8%)	13 (1.3%)	7 (0.7%)	4 (0.4%)	15 (1.5%)	5 (0.5%)	899 (87.3%)	131 (12.7%)
Hospital 126	MTC	652	491 (75.3%)	196 (30.1%)	172 (26.4%)	69 (10.6%)	69 (10.6%)	78 (12%)	264 (40.5%)	354 (54.3%)	298 (45.7%)	387 (59.4%)	198 (30.4%)	50 (7.7%)	17 (2.6%)	358 (54.9%)	63 (9.7%)	185 (28.4%)	46 (7.1%)	124 (19%)	267 (41%)	130 (19.9%)	131 (20.1%)	457 (70.1%)	111 (17%)	23 (3.5%)	16 (2.5%)	7 (1.1%)	20 (3.1%)	18 (2.8%)	577 (88.5%)	75 (11.5%)
Hospital 127	MTC	2	1 (50%)	0 (0%)	1 (50%)	1 (50%)				1 (50%)	1 (50%)	1 (50%)	1 (50%)						2 (100%)			1 (50%)	1 (50%)	2 (100%)							2 (100%)	
Hospital 128	TU	494	259 (52.4%)	10 (2%)	64 (13%)	53 (10.7%)	93 (18.8%)	64 (13%)	220 (44.5%)	237 (48%)	257 (52%)	304 (61.5%)	154 (31.2%)	34 (6.9%)	2 (0.4%)	347 (70.2%)	70 (14.2%)	56 (11.3%)	21 (4.3%)	132 (26.7%)	285 (57.7%)	50 (10.1%)	27 (5.5%)	395 (80%)	52 (10.5%)	13 (2.6%)	4 (0.8%)	1 (0.2%)	3 (0.6%)	26 (5.3%)	463 (93.7%)	31 (6.3%)
Hospital 129	TU	369	230 (62.3%)	9 (2.4%)	103 (27.9%)	60 (16.3%)	79 (21.4%)	46 (12.5%)	81 (22%)	204 (55.3%)	165 (44.7%)	236 (64%)	104 (28.2%)	15 (4.1%)	14 (3.8%)	253 (68.6%)	25 (6.8%)	55 (14.9%)	36 (9.8%)	96 (26%)	203 (55%)	46 (12.5%)	24 (6.5%)	299 (81%)	38 (10.3%)	6 (1.6%)	1 (0.3%)			25 (6.8%)	333 (90.2%)	36 (9.8%)
Hospital 130	TU	338	244 (72.2%)	39 (11.5%)	92 (27.2%)	42 (12.4%)	72 (21.3%)	32 (9.5%)	100 (29.6%)	202 (59.8%)	136 (40.2%)	195 (57.7%)	124 (36.7%)	15 (4.4%)	4 (1.2%)	203 (60.1%)	35 (10.4%)	65 (19.2%)	35 (10.4%)	88 (26%)	140 (41.4%)	54 (16%)	56 (16.6%)	239 (70.7%)	26 (7.7%)	14 (4.1%)	6 (1.8%)	4 (1.2%)	6 (1.8%)	43 (12.7%)	309 (91.4%)	29 (8.6%)
Hospital 131	TU	556	261 (46.9%)	13 (2.3%)	66 (11.9%)	61 (11%)	83 (14.9%)	71 (12.8%)	275 (49.5%)	250 (45%)	306 (55%)	90 (16.2%)	455 (81.8%)	8 (1.4%)	3 (0.5%)	378 (68%)	65 (11.7%)	76 (13.7%)	37 (6.7%)	144 (25.9%)	297 (53.4%)	69 (12.4%)	46 (8.3%)	405 (72.8%)	56 (10.1%)	8 (1.4%)	5 (0.9%)	4 (0.7%)	12 (2.2%)	66 (11.9%)	504 (90.6%)	52 (9.4%)
Hospital 132	MTC	1851	1672 (90.3%)	1145 (61.9%)	731 (39.5%)	250 (13.5%)	207 (11.2%)	197 (10.6%)	466 (25.2%)	1180 (63.7%)	671 (36.3%)	1242 (67.1%)	480 (25.9%)	81 (4.4%)	48 (2.6%)	532 (28.7%)	446 (24.1%)	669 (36.1%)	204 (11%)	297 (16%)	714 (38.6%)	389 (21%)	451 (24.4%)	1232 (66.6%)	282 (15.2%)	117 (6.3%)	62 (3.3%)	33 (1.8%)	66 (3.6%)	59 (3.2%)	1658 (89.6%)	193 (10.4%)
Hospital 133	MTC	1562	1226 (78.5%)	100 (6.4%)	493 (31.6%)	211 (13.5%)	236 (15.1%)	191 (12.2%)	431 (27.6%)	976 (62.5%)	586 (37.5%)	1158 (74.1%)	349 (22.3%)	37 (2.4%)	18 (1.2%)	788 (50.4%)	292 (18.7%)	336 (21.5%)	146 (9.3%)	319 (20.4%)	529 (33.9%)	328 (21%)	386 (24.7%)	952 (60.9%)	269 (17.2%)	136 (8.7%)	75 (4.8%)	36 (2.3%)	66 (4.2%)	28 (1.8%)	1411 (90.3%)	151 (9.7%)
Hospital 134	TU	12	3 (25%)	0 (0%)	3 (25%)	2 (16.7%)	4 (33.3%)	1 (8.3%)	2 (16.7%)	6 (50%)	6 (50%)	9 (75%)	2 (16.7%)		1 (8.3%)	6 (50%)	3 (25%)	2 (16.7%)	1 (8.3%)	4 (33.3%)	4 (33.3%)	2 (16.7%)	2 (16.7%)	12 (100%)							11 (91.7%)	1 (8.3%)
Hospital 135	TU	581	350 (60.2%)	33 (5.7%)	109 (18.8%)	61 (10.5%)	79 (13.6%)	92 (15.8%)	240 (41.3%)	288 (49.6%)	293 (50.4%)	332 (57.1%)	194 (33.4%)	41 (7.1%)	14 (2.4%)	365 (62.8%)	77 (13.3%)	110 (18.9%)	29 (5%)	186 (32%)	267 (46%)	63 (10.8%)	65 (11.2%)	436 (75%)	77 (13.3%)	11 (1.9%)	10 (1.7%)	5 (0.9%)	3 (0.5%)	39 (6.7%)	530 (91.2%)	51 (8.8%)
Hospital 136	TU	542	308 (56.8%)	27 (5%)	83 (15.3%)	58 (10.7%)	97 (17.9%)	71 (13.1%)	233 (43%)	265 (48.9%)	277 (51.1%)	284 (52.4%)	199 (36.7%)	39 (7.2%)	20 (3.7%)	408 (75.3%)	39 (7.2%)	61 (11.3%)	34 (6.3%)	133 (24.5%)	286 (52.8%)	51 (9.4%)	72 (13.3%)	435 (80.3%)	50 (9.2%)	15 (2.8%)	10 (1.8%)	2 (0.4%)	15 (2.8%)	15 (2.8%)	462 (85.2%)	80 (14.8%)
Hospital 137	TU	815	417 (51.2%)	22 (2.7%)	145 (17.8%)	92 (11.3%)	140 (17.2%)	81 (9.9%)	357 (43.8%)	393 (48.2%)	422 (51.8%)	391 (48%)	270 (33.1%)	106 (13%)	48 (5.9%)	567 (69.6%)	102 (12.5%)	81 (9.9%)	65 (8%)	188 (23.1%)	457 (56.1%)	95 (11.7%)	75 (9.2%)	676 (82.9%)	85 (10.4%)	19 (2.3%)	6 (0.7%)	2 (0.2%)	12 (1.5%)	15 (1.8%)	742 (91%)	73 (9%)
Hospital 138	TU	601	349 (58.1%)	45 (7.5%)	115 (19.1%)	76 (12.6%)	100 (16.6%)	73 (12.1%)	237 (39.4%)	290 (48.3%)	311 (51.7%)	347 (57.7%)	170 (28.3%)	57 (9.5%)	27 (4.5%)	413 (68.7%)	44 (7.3%)	93 (15.5%)	51 (8.5%)	124 (20.6%)	341 (56.7%)	71 (11.8%)	65 (10.8%)	491 (81.7%)	62 (10.3%)	14 (2.3%)	6 (1%)	2 (0.3%)	8 (1.3%)	18 (3%)	535 (89%)	66 (11%)
Hospital 139	TU	373	176 (47.2%)	21 (5.6%)	40 (10.7%)	38 (10.2%)	81 (21.7%)	42 (11.3%)	172 (46.1%)	177 (47.5%)	196 (52.5%)	165 (44.2%)	110 (29.5%)	67 (18%)	31 (8.3%)	277 (74.3%)	44 (11.8%)	40 (10.7%)	12 (3.2%)	89 (23.9%)	216 (57.9%)	26 (7%)	42 (11.3%)	302 (81%)	30 (8%)	11 (2.9%)	3 (0.8%)	1 (0.3%)	7 (1.9%)	19 (5.1%)	342 (91.7%)	31 (8.3%)
Hospital 140	TU	362	231 (63.8%)	17 (4.7%)	83 (22.9%)	46 (12.7%)	55 (15.2%)	37 (10.2%)	141 (39%)	185 (51.1%)	177 (48.9%)	203 (56.1%)	113 (31.2%)	33 (9.1%)	13 (3.6%)	236 (65.2%)	60 (16.6%)	36 (9.9%)	30 (8.3%)	72 (19.9%)	221 (61%)	42 (11.6%)	27 (7.5%)	280 (77.3%)	39 (10.8%)	11 (3%)		1 (0.3%)	3 (0.8%)	28 (7.7%)	329 (90.9%)	33 (9.1%)
Hospital 141	TU	453	187 (41.3%)	7 (1.5%)	35 (7.7%)	37 (8.2%)	74 (16.3%)	52 (11.5%)	255 (56.3%)	161 (35.5%)	292 (64.5%)	251 (55.4%)	180 (39.7%)	16 (3.5%)	6 (1.3%)	365 (80.6%)	27 (6%)	35 (7.7%)	26 (5.7%)	119 (26.3%)	272 (60%)	37 (8.2%)	25 (5.5%)	363 (80.1%)	40 (8.8%)	6 (1.3%)	2 (0.4%)			42 (9.3%)	423 (93.4%)	30 (6.6%)
Hospital 142	MTC	2048	1557 (76%)	595 (29.1%)	966 (47.2%)	274 (13.4%)	237 (11.6%)	199 (9.7%)	372 (18.2%)	1468 (71.7%)	580 (28.3%)	1218 (59.5%)	752 (36.7%)	59 (2.9%)	19 (0.9%)	545 (26.6%)	470 (22.9%)	739 (36.1%)	294 (14.4%)	283 (13.8%)	765 (37.4%)	453 (22.1%)	547 (26.7%)	1296 (63.3%)	331 (16.2%)	138 (6.7%)	95 (4.6%)	37 (1.8%)	106 (5.2%)	45 (2.2%)	1735 (84.7%)	313 (15.3%)
Hospital 143	TU	956	599 (62.7%)	72 (7.5%)	149 (15.6%)	88 (9.2%)	125 (13.1%)	134 (14%)	460 (48.1%)	470 (49.2%)	486 (50.8%)	491 (51.4%)	332 (34.7%)	99 (10.4%)	34 (3.6%)	672 (70.3%)	116 (12.1%)	105 (11%)	63 (6.6%)	225 (23.5%)	445 (46.5%)	143 (15%)	143 (15%)	709 (74.2%)	162 (16.9%)	37 (3.9%)	16 (1.7%)	4 (0.4%)	18 (1.9%)	10 (1%)	823 (86.1%)	133 (13.9%)
Hospital 144	TU	496	259 (52.2%)	10 (2%)	99 (20%)	65 (13.1%)	104 (21%)	58 (11.7%)	170 (34.3%)	257 (51.8%)	239 (48.2%)	302 (60.9%)	160 (32.3%)	24 (4.8%)	10 (2%)	337 (67.9%)	55 (11.1%)	51 (10.3%)	53 (10.7%)	139 (28%)	257 (51.8%)	49 (9.9%)	51 (10.3%)	371 (74.8%)	42 (8.5%)	13 (2.6%)	4 (0.8%)		8 (1.6%)	58 (11.7%)	450 (90.7%)	46 (9.3%)
Hospital 145	TU	960	615 (64.1%)	59 (6.1%)	137 (14.3%)	86 (9%)	137 (14.3%)	116 (12.1%)	484 (50.4%)	413 (43%)	547 (57%)	510 (53.1%)	278 (29%)	116 (12.1%)	56 (5.8%)	674 (70.2%)	111 (11.6%)	130 (13.5%)	45 (4.7%)	263 (27.4%)	499 (52%)	119 (12.4%)	79 (8.2%)	784 (81.7%)	124 (12.9%)	18 (1.9%)	3 (0.3%)	1 (0.1%)	3 (0.3%)	27 (2.8%)	878 (91.5%)	82 (8.5%)
Hospital 146	TU	382	222 (58.1%)	13 (3.4%)	107 (28%)	55 (14.4%)	65 (17%)	47 (12.3%)	108 (28.3%)	232 (60.7%)	150 (39.3%)	241 (63.1%)	85 (22.3%)	31 (8.1%)	25 (6.5%)	244 (63.9%)	40 (10.5%)	50 (13.1%)	48 (12.6%)	100 (26.2%)	184 (48.2%)	65 (17%)	33 (8.6%)	307 (80.4%)	35 (9.2%)	5 (1.3%)	2 (0.5%)	3 (0.8%)	2 (0.5%)	28 (7.3%)	358 (93.7%)	24 (6.3%)
Hospital 147	TU	483	208 (43.1%)	5 (1%)	87 (18%)	58 (12%)	82 (17%)	74 (15.3%)	182 (37.7%)	204 (42.2%)	279 (57.8%)	262 (54.2%)	145 (30%)	48 (9.9%)	28 (5.8%)	352 (72.9%)	47 (9.7%)	45 (9.3%)	39 (8.1%)	105 (21.7%)	267 (55.3%)	63 (13%)	48 (9.9%)	402 (83.2%)	42 (8.7%)	11 (2.3%)	4 (0.8%)	4 (0.8%)	10 (2.1%)	10 (2.1%)	406 (84.1%)	77 (15.9%)
Hospital 148	TU	848	395 (46.6%)	39 (4.6%)	177 (20.9%)	105 (12.4%)	151 (17.8%)	113 (13.3%)	302 (35.6%)	437 (51.5%)	411 (48.5%)	513 (60.5%)	266 (31.4%)	47 (5.5%)	22 (2.6%)	536 (63.2%)	147 (17.3%)	67 (7.9%)	98 (11.6%)	241 (28.4%)	408 (48.1%)	103 (12.1%)	96 (11.3%)	688 (81.1%)	100 (11.8%)	16 (1.9%)	9 (1.1%)	1 (0.1%)	15 (1.8%)	19 (2.2%)	773 (91.2%)	75 (8.8%)
Hospital 149	TU	26	20 (76.9%)	2 (7.7%)	9 (34.6%)	3 (11.5%)	6 (23.1%)	7 (26.9%)	1 (3.8%)	14 (53.8%)	12 (46.2%)	17 (65.4%)	9 (34.6%)			12 (46.2%)	6 (23.1%)	6 (23.1%)	2 (7.7%)	5 (19.2%)	15 (57.7%)	6 (23.1%)		17 (65.4%)	7 (26.9%)					2 (7.7%)	21 (80.8%)	5 (19.2%)
Hospital 150	TU	186	76 (40.9%)	5 (2.7%)	58 (31.2%)	25 (13.4%)	45 (24.2%)	13 (7%)	45 (24.2%)	118 (63.4%)	68 (36.6%)	125 (67.2%)	47 (25.3%)	9 (4.8%)	5 (2.7%)	99 (53.2%)	22 (11.8%)	36 (19.4%)	29 (15.6%)	39 (21%)	94 (50.5%)	32 (17.2%)	21 (11.3%)	160 (86%)	17 (9.1%)	3 (1.6%)	1 (0.5%)		1 (0.5%)	4 (2.2%)	162 (87.1%)	24 (12.9%)
Hospital 151	TU	732	415 (56.7%)	53 (7.2%)	139 (19%)	108 (14.8%)	145 (19.8%)	77 (10.5%)	263 (35.9%)	396 (54.1%)	336 (45.9%)	335 (45.8%)	267 (36.5%)	83 (11.3%)	47 (6.4%)	456 (62.3%)	129 (17.6%)	86 (11.7%)	61 (8.3%)	129 (17.6%)	370 (50.5%)	126 (17.2%)	107 (14.6%)	590 (80.6%)	77 (10.5%)	27 (3.7%)	13 (1.8%)	3 (0.4%)	15 (2%)	7 (1%)	665 (90.8%)	67 (9.2%)
Hospital 152	TU	570	306 (53.7%)	18 (3.2%)	59 (10.4%)	48 (8.4%)	74 (13%)	68 (11.9%)	321 (56.3%)	245 (43%)	325 (57%)	248 (43.5%)	280 (49.1%)	30 (5.3%)	12 (2.1%)	450 (78.9%)	37 (6.5%)	55 (9.6%)	28 (4.9%)	128 (22.5%)	293 (51.4%)	71 (12.5%)	78 (13.7%)	451 (79.1%)	58 (10.2%)	20 (3.5%)	9 (1.6%)	2 (0.4%)	6 (1.1%)	24 (4.2%)	532 (93.3%)	38 (6.7%)
Hospital 153	TU	230	147 (63.9%)	6 (2.6%)	73 (31.7%)	40 (17.4%)	22 (9.6%)	20 (8.7%)	75 (32.6%)	130 (56.5%)	100 (43.5%)	107 (46.5%)	101 (43.9%)	14 (6.1%)	8 (3.5%)	115 (50%)	27 (11.7%)	53 (23%)	35 (15.2%)	43 (18.7%)	93 (40.4%)	60 (26.1%)	34 (14.8%)	174 (75.7%)	28 (12.2%)	8 (3.5%)	3 (1.3%)	2 (0.9%)	7 (3%)	8 (3.5%)	214 (93%)	16 (7%)
Hospital 154	TU	3	3 (100%)	1 (33.3%)	1 (33.3%)	2 (66.7%)				1 (33.3%)	2 (66.7%)	2 (66.7%)	1 (33.3%)			1 (33.3%)	1 (33.3%)	1 (33.3%)			2 (66.7%)	1 (33.3%)		3 (100%)							2 (66.7%)	1 (33.3%)
Hospital 155	TU	161	102 (63.4%)	5 (3.1%)	42 (26.1%)	28 (17.4%)	35 (21.7%)	19 (11.8%)	37 (23%)	99 (61.5%)	62 (38.5%)	88 (54.7%)	62 (38.5%)	7 (4.3%)	4 (2.5%)	78 (48.4%)	29 (18%)	41 (25.5%)	13 (8.1%)	36 (22.4%)	80 (49.7%)	22 (13.7%)	23 (14.3%)	127 (78.9%)	17 (10.6%)	4 (2.5%)	4 (2.5%)		2 (1.2%)	7 (4.3%)	146 (90.7%)	15 (9.3%)
Hospital 156	TU	443	264 (59.6%)	14 (3.2%)	82 (18.5%)	48 (10.8%)	84 (19%)	62 (14%)	167 (37.7%)	207 (46.7%)	236 (53.3%)	263 (59.4%)	142 (32.1%)	34 (7.7%)	4 (0.9%)	285 (64.3%)	55 (12.4%)	67 (15.1%)	36 (8.1%)	92 (20.8%)	238 (53.7%)	53 (12%)	60 (13.5%)	346 (78.1%)	75 (16.9%)	6 (1.4%)	2 (0.5%)	1 (0.2%)	3 (0.7%)	10 (2.3%)	397 (89.6%)	46 (10.4%)
Hospital 157	TU	767	320 (41.7%)	48 (6.3%)	155 (20.2%)	114 (14.9%)	139 (18.1%)	117 (15.3%)	242 (31.6%)	397 (51.8%)	370 (48.2%)	340 (44.3%)	357 (46.5%)	54 (7%)	16 (2.1%)	499 (65.1%)	94 (12.3%)	112 (14.6%)	62 (8.1%)	201 (26.2%)	389 (50.7%)	86 (11.2%)	91 (11.9%)	648 (84.5%)	60 (7.8%)	14 (1.8%)	7 (0.9%)	4 (0.5%)	20 (2.6%)	14 (1.8%)	680 (88.7%)	87 (11.3%)
Hospital 158	TU	249	17 (6.8%)	5 (2%)	56 (22.5%)	39 (15.7%)	46 (18.5%)	24 (9.6%)	84 (33.7%)	133 (53.4%)	116 (46.6%)	139 (55.8%)	96 (38.6%)	12 (4.8%)	2 (0.8%)	168 (67.5%)	26 (10.4%)	31 (12.4%)	24 (9.6%)	57 (22.9%)	136 (54.6%)	34 (13.7%)	22 (8.8%)	175 (70.3%)	13 (5.2%)	1 (0.4%)	1 (0.4%)		3 (1.2%)	56 (22.5%)	226 (90.8%)	23 (9.2%)
Hospital 159	TU	496	280 (56.5%)	32 (6.5%)	88 (17.7%)	50 (10.1%)	63 (12.7%)	54 (10.9%)	241 (48.6%)	228 (46%)	268 (54%)	282 (56.9%)	150 (30.2%)	48 (9.7%)	16 (3.2%)	326 (65.7%)	45 (9.1%)	89 (17.9%)	36 (7.3%)	124 (25%)	243 (49%)	80 (16.1%)	49 (9.9%)	359 (72.4%)	64 (12.9%)	12 (2.4%)	6 (1.2%)	2 (0.4%)	4 (0.8%)	49 (9.9%)	454 (91.5%)	42 (8.5%)
Hospital 160	TU	470	291 (61.9%)	19 (4%)	94 (20%)	44 (9.4%)	75 (16%)	46 (9.8%)	211 (44.9%)	238 (50.6%)	232 (49.4%)	171 (36.4%)	274 (58.3%)	19 (4%)	6 (1.3%)	294 (62.6%)	52 (11.1%)	81 (17.2%)	43 (9.1%)	138 (29.4%)	204 (43.4%)	67 (14.3%)	61 (13%)	369 (78.5%)	55 (11.7%)	11 (2.3%)	5 (1.1%)	2 (0.4%)	5 (1.1%)	23 (4.9%)	428 (91.1%)	42 (8.9%)
Hospital 161	TU	208	91 (43.8%)	3 (1.4%)	39 (18.8%)	33 (15.9%)	52 (25%)	25 (12%)	59 (28.4%)	117 (56.3%)	91 (43.8%)	133 (63.9%)	68 (32.7%)	5 (2.4%)	2 (1%)	144 (69.2%)	35 (16.8%)	16 (7.7%)	13 (6.3%)	64 (30.8%)	103 (49.5%)	30 (14.4%)	11 (5.3%)	183 (88%)	13 (6.3%)	3 (1.4%)			2 (1%)	7 (3.4%)	193 (92.8%)	15 (7.2%)
Hospital 162	TU	10	8 (80%)	0 (0%)	1 (10%)		1 (10%)	1 (10%)	7 (70%)	6 (60%)	4 (40%)	4 (40%)	4 (40%)	2 (20%)		9 (90%)			1 (10%)	1 (10%)	1 (10%)	4 (40%)	4 (40%)	4 (40%)	4 (40%)	1 (10%)				1 (10%)	9 (90%)	1 (10%)
Hospital 163	TU	613	372 (60.7%)	73 (11.9%)	115 (18.8%)	76 (12.4%)	106 (17.3%)	49 (8%)	267 (43.6%)	299 (48.8%)	314 (51.2%)	350 (57.1%)	154 (25.1%)	75 (12.2%)	34 (5.5%)	406 (66.2%)	70 (11.4%)	111 (18.1%)	26 (4.2%)	199 (32.5%)	301 (49.1%)	81 (13.2%)	32 (5.2%)	505 (82.4%)	69 (11.3%)	5 (0.8%)				34 (5.5%)	547 (89.2%)	66 (10.8%)
Hospital 164	TU	562	333 (59.3%)	44 (7.8%)	125 (22.2%)	55 (9.8%)	86 (15.3%)	57 (10.1%)	239 (42.5%)	286 (50.9%)	276 (49.1%)	366 (65.1%)	164 (29.2%)	21 (3.7%)	11 (2%)	342 (60.9%)	66 (11.7%)	114 (20.3%)	40 (7.1%)	129 (23%)	273 (48.6%)	82 (14.6%)	78 (13.9%)	439 (78.1%)	74 (13.2%)	14 (2.5%)	9 (1.6%)	7 (1.2%)	10 (1.8%)	9 (1.6%)	490 (87.2%)	72 (12.8%)
Hospital 165	TU	606	74 (12.2%)	27 (4.5%)	129 (21.3%)	76 (12.5%)	113 (18.6%)	74 (12.2%)	214 (35.3%)	299 (49.3%)	307 (50.7%)	354 (58.4%)	174 (28.7%)	51 (8.4%)	27 (4.5%)	355 (58.6%)	83 (13.7%)	117 (19.3%)	51 (8.4%)	155 (25.6%)	286 (47.2%)	80 (13.2%)	85 (14%)	469 (77.4%)	64 (10.6%)	15 (2.5%)	1 (0.2%)	7 (1.2%)	4 (0.7%)	46 (7.6%)	552 (91.1%)	54 (8.9%)
Hospital 166	TU	284	218 (76.8%)	36 (12.7%)	92 (32.4%)	48 (16.9%)	50 (17.6%)	38 (13.4%)	56 (19.7%)	181 (63.7%)	103 (36.3%)	210 (73.9%)	56 (19.7%)	14 (4.9%)	4 (1.4%)	109 (38.4%)	67 (23.6%)	78 (27.5%)	30 (10.6%)	45 (15.8%)	116 (40.8%)	54 (19%)	69 (24.3%)	223 (78.5%)	22 (7.7%)	6 (2.1%)	12 (4.2%)	5 (1.8%)	15 (5.3%)	1 (0.4%)	258 (90.8%)	26 (9.2%)
Hospital 167	TU	304	238 (78.3%)	25 (8.2%)	108 (35.5%)	49 (16.1%)	41 (13.5%)	29 (9.5%)	77 (25.3%)	207 (68.1%)	97 (31.9%)	186 (61.2%)	89 (29.3%)	20 (6.6%)	9 (3%)	148 (48.8%)	44 (14.5%)	45 (14.8%)	33 (10.9%)	81 (26.6%)	145 (47.7%)	45 (14.8%)	33 (10.9%)	211 (69.4%)	35 (11.5%)	12 (3.9%)	5 (1.6%)	1 (0.3%)	3 (1%)	37 (12.2%)	280 (92.1%)	24 (7.9%)