The London North West Hospitals
NHS Trust

Changing Rehabilitation through Audit

Specialist Rehabilitation following Major Trauma – a National Clinical Audit

The Health Quality Improvement Partnership

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UK Rehabilitation Outcomes Collaborative (UKROC)
Trauma Audit and Research Network (TARN)
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TARN
THE TRAUMA AUDIT & RESEARCH NETWORK

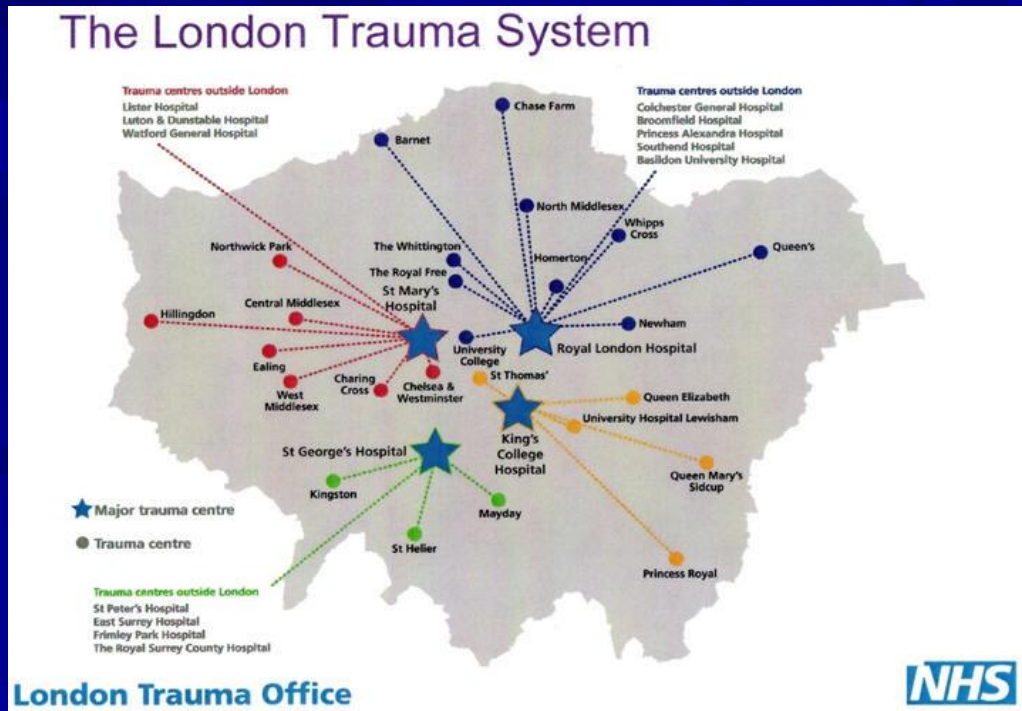
HQIP
Healthcare Quality Improvement Partnership

Trauma networks

- 2010 – Department of Health
  - Major Trauma networks
    - Framework for coordinated trauma care

- Key components
  - Major Trauma Centres (MTCs)
  - Trauma Units

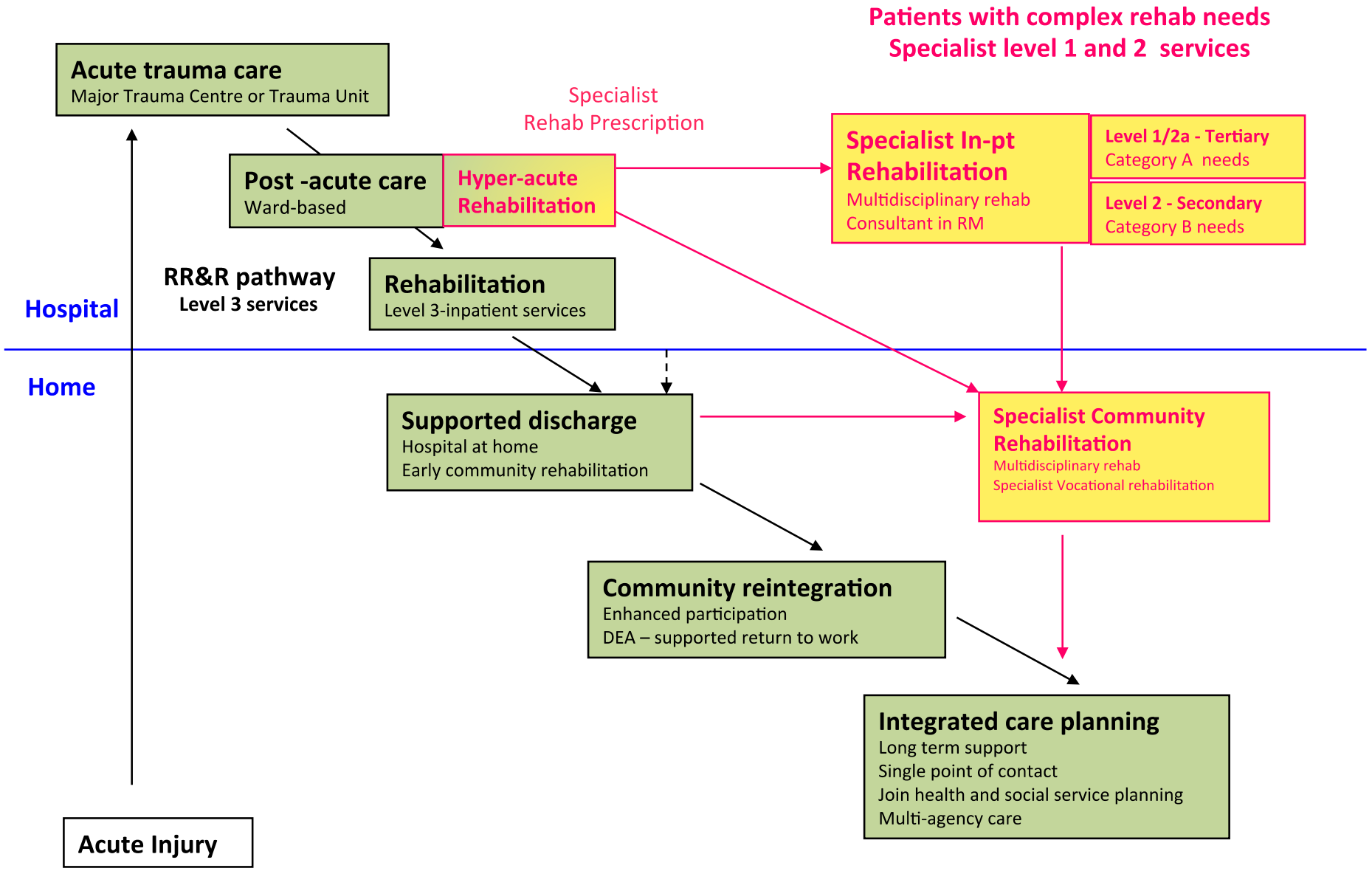
- Something missing ???



Specialist rehabilitation

- Critical component of the Trauma care pathway
  - Major trauma networks
    - Will undoubtedly fail without it
- Major trauma
  - Complex range of impairments and disabilities
    - Physical
    - Cognitive
    - Communicative
    - Emotional
    - Social
    - Behavioural
  - Many of which are long-lasting

Rehabilitation pathway following acute trauma



Evidence from Acquired brain injury

Area	Evidence for effectiveness	
Evidence for effectiveness	Trial-based*	Practice-based
• Early and/or intensive rehabilitation	Strong (n=309)	Strong (n=1309)
• Specialist in-pt rehabilitation (severe / v severe ABI)	Limited (n=111)	Strong (n=963)
• Specialist behavioural programmes		Strong (n=140)
• Community based rehabilitation	Moderate (n=382)	Strong (n=547)
• Specialist Vocational Rehabilitation		Strong (n=433)
• Long-term outcomes		Strong (n=256)
Evidence for cost effectiveness		
• Specialist in-pt rehabilitation (severe / v severe ABI)		Moderate
• Vocational rehabilitation		Strong

Turner-Stokes et al Cochrane Review: 2008 }
Turner-Stokes J Rehabil Med 2008; 40: 691-701 } both currently being updated

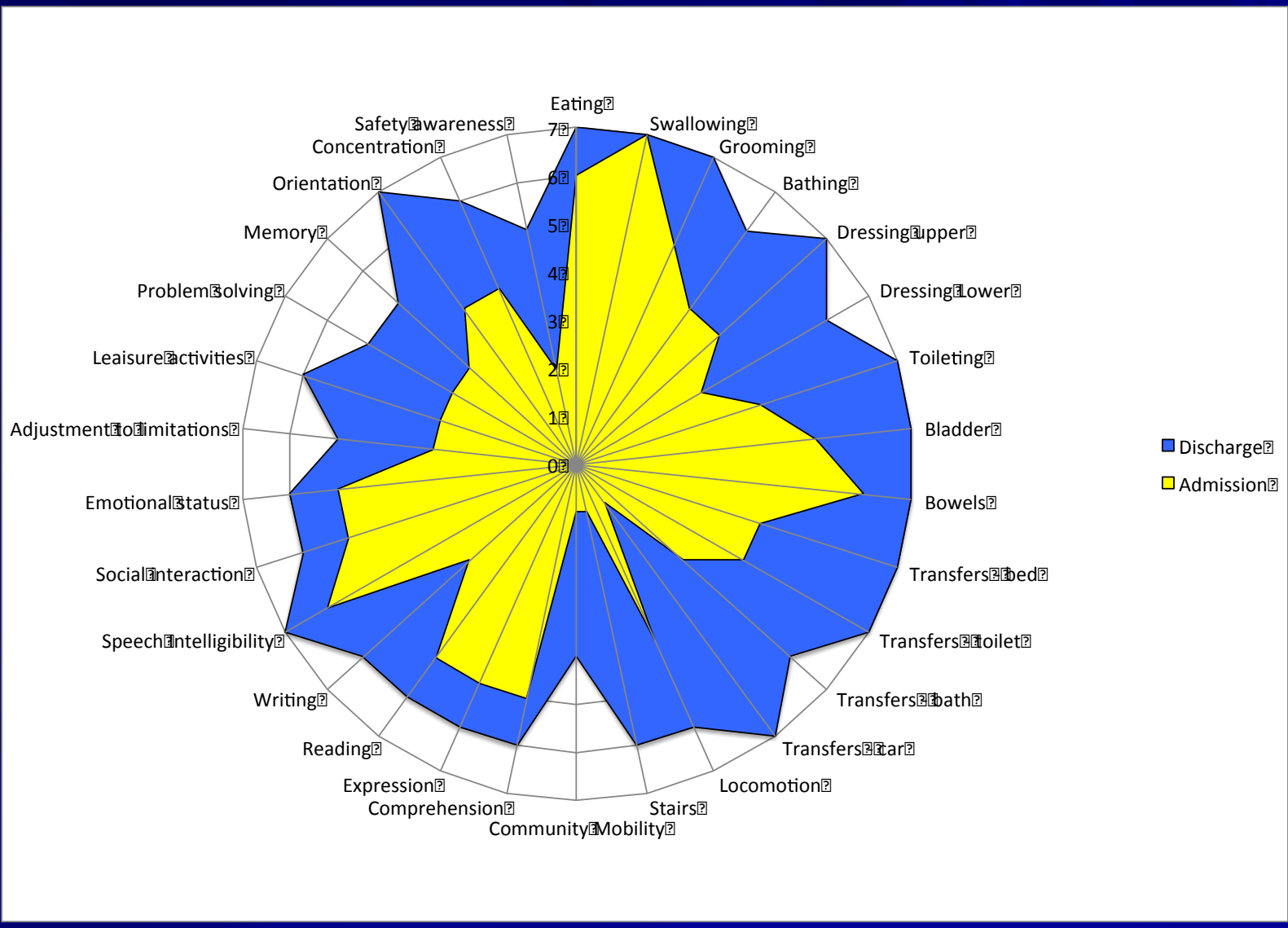
UKROC (UK Rehabilitation Outcomes Collaborative)

- National clinical database
  - Episode data
    - All specialist (Level 1 and 2) rehabilitation services
- Collects data on
  - Rehabilitation needs
    - Complexity – Rehabilitation Complexity Scale
  - Inputs
    - Nursing and therapy hours – by discipline
  - Outcomes
    - Independence – UK FIM+FAM
    - Cost-efficiency – NPDS / Care Needs Assessment
- National commissioning database
  - Bench-marking on quality and outcomes

Analysis

- Dataset 2010-2014 – 5 years
  - Total 11,428 episodes
  - Trauma 1663 episodes
    - 87% traumatic brain injury
    - 12% spinal cord injury
    - 1% other
  - Mean age 45.4 years
  - Mean length of stay 91 days

UK FIM+FAM- FAM Splat



Cost-efficiency index

4-month admission for rehabilitation

Care package

Admission:

Two live-in carers (£2500/wk)

Discharge

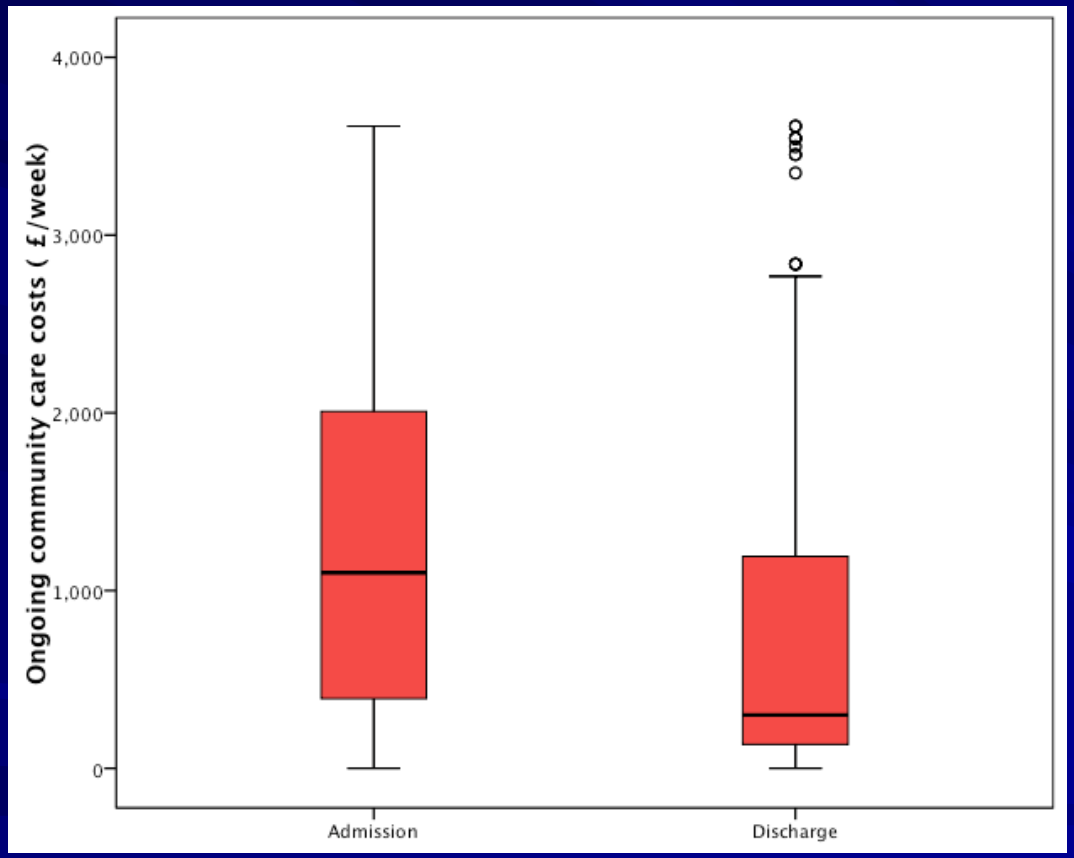
1 live-in carer (£1250/wk)

Cost of rehabilitation programme - £70,000

Savings in on-going care - £1250/week

Time to offset the cost in 14 months

Cost efficiency



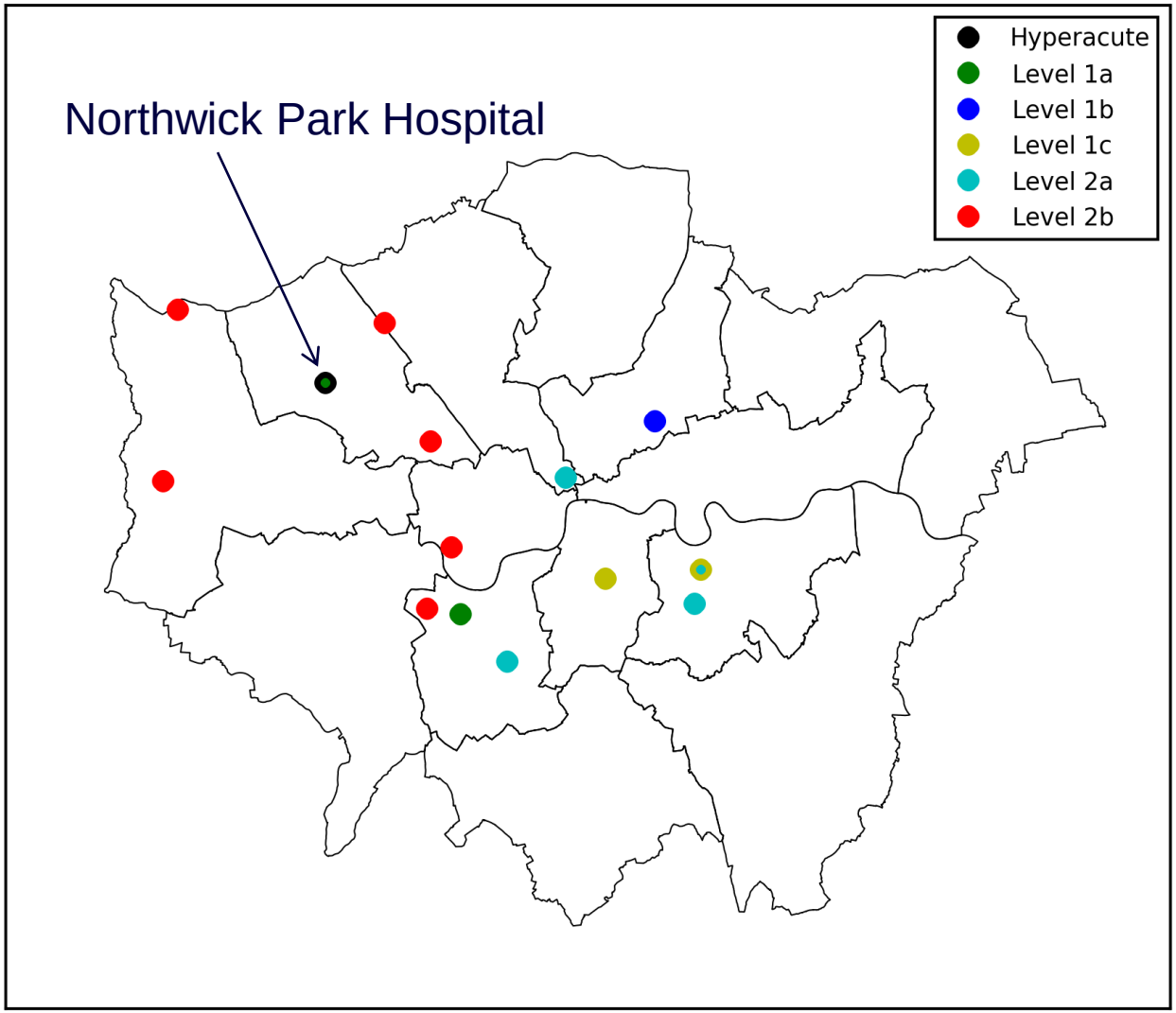
Parameter	Mean
Cost of treatment	
Length of stay	91 days
Cost per day	£425
Episode costs	£38,311
Subset n=809 – reported NPCNA	
Mean reduction in care costs	£527 per week
Cost efficiency index	5.8
Time to offset cost of rehabilitation	18 months

Cost-effectiveness

- Analysed in 3 groups of dependency:
  - Savings in long-term costs of care

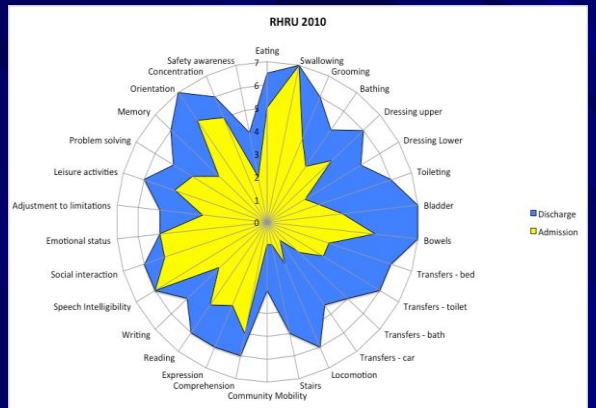
Dependency on admission	High NPDS > 25 N=382	Medium NPDS >10-24 N=235	Low NPDS <10 N=192
Cost of rehab	£44,290	£25,320	£19,010
Mean reduction in care costs /wk	£724	£548	£107
Time offset cost	15 months	11 months	44 months
Cost Efficiency Index	7.0	9.2	2.4

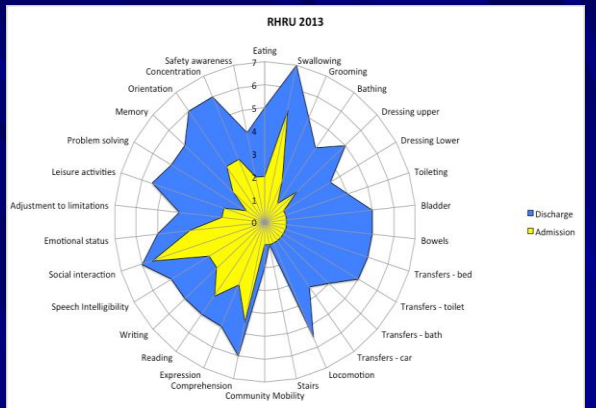
London Specialist Rehabilitation Services

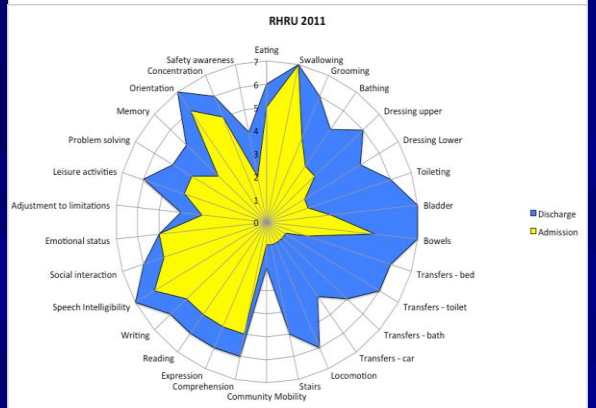


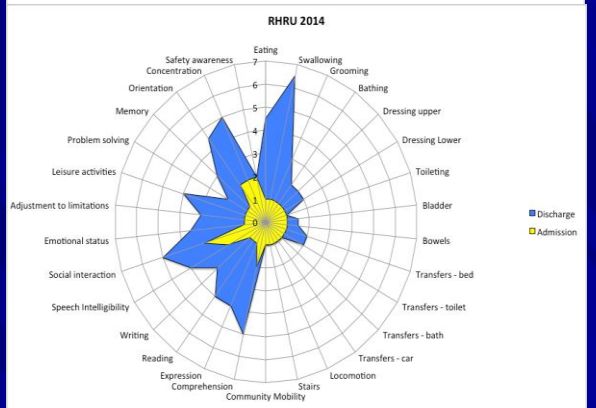
Our unit:

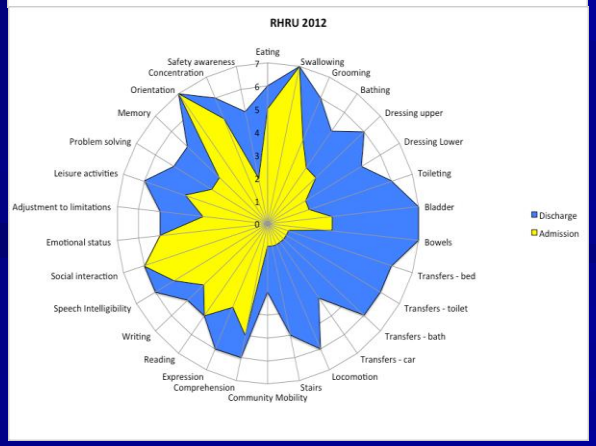
Changing profile since 2010

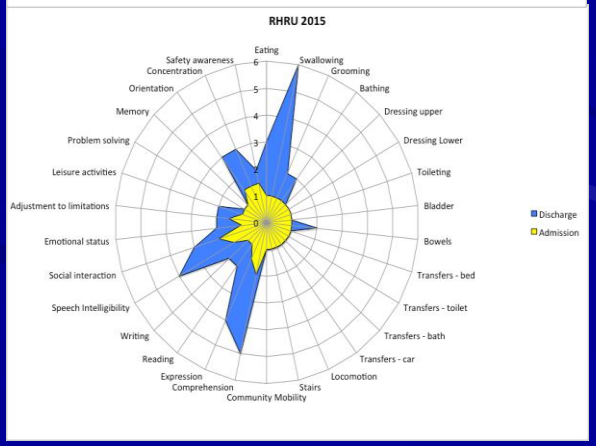












Cost efficiency – our unit

	Mean Rehabilitation costs		Mean care costs/week in the community			Time to offset
Year	Length of stay	Episode Cost	Admission	Discharge	Change	Months
2010	112	£62,580	£1,258	£826	-£432	30
2011	102	£57,200	£1,344	£908	-£437	34
2012	87	£48,846	£1,629	£973	-£649	26
2013	105	£58,924	£1,767	£1,174	-£594	16
2014	105	£59,014	£2,179	£1,550	-£629	14
2015	90	£50,377	£2,176	£1,551	-£624	16

Dearth of specialist rehabilitation

- After treatment in Major Trauma Centres
  - Many patients ‘repatriated’ to their local DGH
    - To wait for specialist rehabilitation
  - Get lost in the system
- Rehabilitation prescription
  - Now introduced into trauma networks
    - Rehabilitation plan from early stages of acute care
    - Records ongoing needs / referrals
      - Track progress and outcomes
  - In early stages of implementation

Specialist Rehabilitation Prescription

- British Society for Rehabilitation Medicine (BSRM)
  - Specialist rehabilitation following Major Trauma
    - Core Clinical Standards
  - Specialist Rehabilitation Prescription
    - For patients with complex rehabilitation needs
      - Requiring specialist rehabilitation (Level 1 and 2) services
  - Key features: Extension of the RP (not a replacement)
    - Drawn up by a Consultant in Rehabilitation Medicine
      - In-reach from specialist rehabilitation services
    - Defines complex rehabilitation needs (category A and B)
      - Patient Categorisation Tool (PCAT), Rehabilitation Complexity Scale
    - Sign-posts patient down the correct pathway
    - Expedites referral and transfer to Level 1 and 2 services

National Clinical Audit

- Health Quality Improvement Partnership
  - National Clinical Audit and Patient Outcomes Programme (NCAPOP)
- Specialist Rehabilitation following Major Trauma
  - Funded by NHS England and the Welsh Government
    - Measure Healthcare practice
      - Against specific standards
    - Benchmarked reports to improve care provided
- Participation in the NCAPOP is mandated
  - Under standard hospital contract terms and conditions

Key standards

- NHS England services specifications
  - Major Trauma
  - Specialist Rehabilitation
- BSRM – core clinical standards

- Standards concern:
  - Prompt assessment of rehabilitation needs
    - By a consultant specialist in Rehabilitation Medicine
  - Timely transfer to Level 1 and 2 services
  - Rehabilitation provision
    - Specialist skills and facilities
    - Appropriate intensity of multi-disciplinary rehabilitation programmes
  - Outcomes and cost-efficiency

Existing databases

- TARN database
  - Captures episodes admitted to MTCs
    - Currently 4 crude data items relate to rehabilitation
      - Rehabilitation Prescription completed
      - Presence of Physical disability
        - and cognitive and psychosocial factors
- UKROC database
  - Captures episodes – Specialist rehabilitation
    - Extensive dataset
      - Rehabilitation needs – Rehabilitation Complexity Scale
      - Inputs – medical, nursing, therapies
      - Outcomes – functional gain and cost-efficiency

Outline of Programme

- Objectives
  - To map current provision
    - Specialist rehabilitation services
      - relationship to MTCs
    - Use of the Specialist Rehabilitation Prescription
  - To link the UKROC and TARN Datasets – via NHS number
    - Track patients through the pathway
- Questions
  - Are with complex needs referred to Specialist rehabilitation?
  - If so, do they receive it?
    - And what are the outcomes - functional gain and cost efficiency
  - If not – why not?
    - What else do they get?
    - Does it meet their needs?

3 main parts

- Organisational audit – year 1
  - Identify Level 1 and 2 services
    - Providing care to trauma patients
    - Map pathways – into and out of these services
- Prospective clinical audit – year 2-3
  - Of patients presenting to MTCs with category A and B needs
    - How many receive specialist rehabilitation?
    - If they do not – why not
- Feasibility study – year 2-3
  - Identify pathway and outcomes
    - For patients with complex needs requiring Level 1/2 services
      - Who do not subsequently attend

In Progress

- Initial contract 3 years
  - Potentially extendable to 5 years
  - Will include Defence Medical Services and Wales
    - Pathways for this will be explored in year 1.
- Started July 2015
  - Application for Section 251 approval
    - To collect NHS number for data linkage
  - Service mapping
    - Interviews with Network Rehabilitation Coordinators
      - Service arrangements - Perceived gaps
      - Rehabilitation input in MTCs
        - Implementation of Specialist Rehabilitation Prescription
      - Identify participating sites for prospective audit

Next phase

- Prospective clinical audit
  - Major Trauma Units
    - Specialist Level 1 and 2 rehabilitation services
- To what extent do current service arrangements
  - Meet the published standards of care
    - For patients with complex rehabilitation needs
      - Following major trauma
- Critical
  - Identify patients with Category A and B needs
    - On discharge from MTC
      - So that we can track them down the pathway

Key standards

- Within MTCs – Patients with ISS≥9
  - Rehab planning start within 48 hours
    - Including standard Rehabilitation Prescription
  - If likely to have complex needs
    - RCS-ET
    - Checklist of Complex Needs
  - Assessment by an RM consultant (or designated deputy)
    - within 3 working days
    - Patient Categorisation tool (PCAT)
- If category A/B needs confirmed:
  - A Specialist Rehabilitation Prescription (SpRP) by discharge:
    - Key measurement tools
      - RCS-ET, NS-Trauma, NPDS
    - Details of referral to Level 1/2 services
    - Discharge destination.

Standards for assessment and transfer to Level 1/2 rehabilitation

- Following referral
  - Assessed by rehab service within 10 days
    - PCAT tool confirmed – or completed if not done already
- If accepted, but not yet fit for Transfer
  - 'Inactive waiting list'
  - Serial RCS-M scores until R point reached
    - (RCS-ET M=3-4)
- Patients requiring Level1/2 services
  - Should be admitted within 6 weeks of R point

Specialist Level 1 / 2 services

- Element 1:
  - Service standards
    - from UKROC service profiles
- Element 2 – prospective audit
  - Assessment of function and rehabilitation needs
    - Within 10 days of admission
    - And 7 days of discharge
  - By discharge:
    - All will have achieved measurable gain
      - On one or more approved measure:
      - NPDS, UK FIM+FAM, GAS-T score
        - (Or other approved measure)
    - Cost efficiency within 2 St Devs of the mean for service group
      - Reasons for outlying services explored and reported

Tools

Complexity checklist

Checklist of needs that are likely to require specialist rehabilitation (tick any that apply) (Examples)		Specialist needs?
Specialist rehab medical (RM) or neuropsychiatric needs	❒ On-going specialist investigation/ intervention ❒ Complex / unstable medical/surgical condition ❒ Complex psychiatric needs ❒ Risk management or Treatment under section of the MHA	❒ Yes ❒ No
Specialist rehabilitation environment	❒ Co-ordinated inter-disciplinary input ❒ Structured 24 hour rehabilitation environment ❒ Highly specialist therapy /rehab nursing skills	❒ Yes ❒ No
High intensity	❒ 1:1 supervision ❒ ≥4 therapy disciplines required ❒ High intensive programme (>20 hours per week) ❒ Length of of rehabilitation ≥ 3 months	❒ Yes ❒ No
Specialist Vocational Rehab	❒ Specialist vocational assessment ❒ Multi-agency vocational support (for return to work /re-training /work withdrawal) ❒ Complex support for other roles (eg single parenting)	❒ Yes ❒ No
Medico-legal issues	❒ Complex mental capacity / consent issues ❒ Complex Best interests decisions ❒ DoLs / PoVA applications ❒ Litigation issues	❒ Yes ❒ No
Specialist facilities / equipment needs	❒ Customised / bespoke personal equipment needs (eg Electronic assistance technology, communication aid, customised seating, bespoke prosthetics/orthotics) ❒ Specialist rehabilitation facilities (eg treadmill training, computers, FES, Hydrotherapy etc)	❒ Yes ❒ No

RCS-ET – score range 0-25

	0	1	2	3	4	5	6
Medical	None active	Basic	Specialist	Potentially unstable	Acute medical / surgical	TU	MTC
Care	Independent	1 carer	2 carers	≥ 3 carers	1:1 supervision		
Risk	None	Low	Medium	High	Very high		
Nursing	None	Qualified	Rehab nurse	Specialist nursing	High acuity		
Therapy disciplines	None	1	2-3	4-5	≥ 6		
Therapy Intensity (Total therapy time)	None	Low level (< daily) <15 hrs/wk	Moderate (eg daily) 15-24 hrs/wk	High (+ assistant) 25-30 hrs/wk	Very high >30 hours/wk		
Equipment	None	Basic	Specialist	Extremely	-		

PCAT tool

	Category A needs (Score 3)	Category B needs (Score 2)	Category C needs (Score 1)
Medical/neuropsychiatric	Complex	Medium	Low
Therapy Intensity	Very high	High	Standard
Clinical needs	Severe / complex	Moderate / standard	None/ high level
Physical	3	2	1
Tracheostomy/ventilatory	3	2	1
Swallowing / nutrition	3	2	1
Communication	3	2	1
Cognitive	3	2	1
Behavioural	3	2	1
Mood/emotion	3	2	1
Complex disability management	3	2	1
Social / discharge planning	3	2	1
Family support	3	2	1
Emotional load on staff	3	2	1
Vocational	Complex	Standard	None
Medico-legal	Complex	Standard	None
Equipment	High/y specialist	Moderate	One/ off the shelf

NIS-Trauma

Neurological Impairment Set			Additional Trauma set	
Motor	14		Bladder	3
Tone	3		Bowels	3
Sensation	3		Skin integrity	3
Perceptual function	3		Nutritional status	3
Speech and language	3		Substance abuse	3
Cognitive	3		Fractures	21
Behaviour	3		Limb loss	12
Mood	3		Vascular	3
Vision	3		Chest / abdominal injuries	3
Hearing	3		Co-morbid conditions	3
Pain	3		Other	3
Fatigue	3		**Total**	**60**
Seizures	3			
Total	**50**			

NPDS

Basic care needs			Special nursing	
Mobility	0-4		Tracheostomy	0/5
Bed transfers	0-3		Wound/pressure sore	0/5
Toileting bladder			> 2 interventions/night	0/5
Assistance	0-4		Psychological support	0/5
Accidents	0-3		Isolation	0/5
Toileting bowels			Intercurrent illness	0/5
Assistance	0-5		One-to-one specialing	0/5
Accidents	0-3		**Total**	**0-35**
Washing/grooming	0-5			
Bathing/showering	0-5			
Dressing	0-5		**Community questions**	
Eating	0-3		Stairs	
Drinking	0-3		Making a snack	
Enteral Feed	0-4		Medication	
Skin pressure relief	0-5		Help from Nurse / trained carer	
Safety awareness	0-3		Help for Domestic duties	
Communication	0-5			
Behaviour	0-5			
Total	**0-65**			

Discussion

- Phase 2 to start in July 2016

- Feasibility
  - Ideas for data collection
  - How can we help?

Acknowledgement

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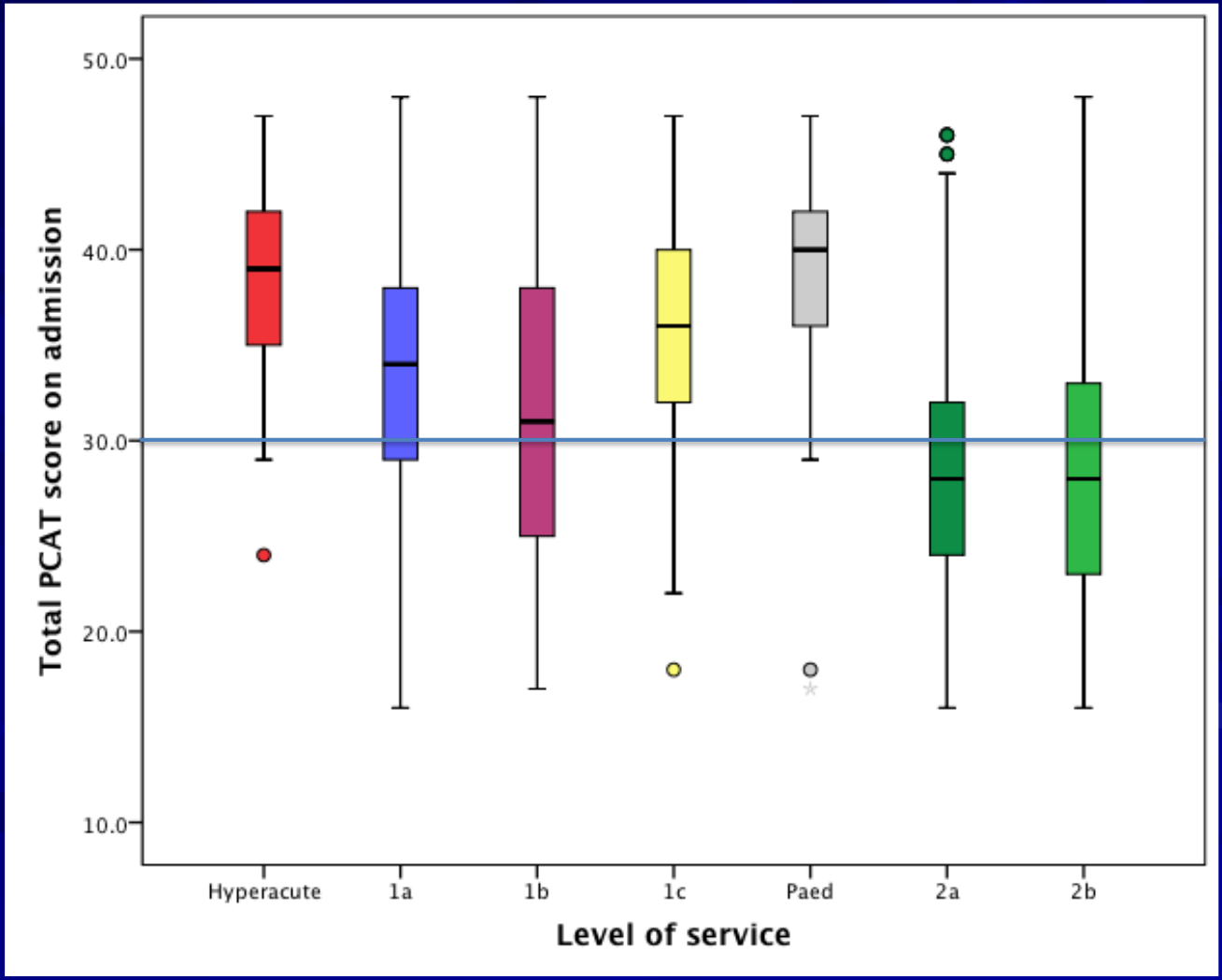
- With many thanks to the UKROC team and all the clinicians and patients who contributed data to the UKROC programme.
- The UKROC programme is registered PbR Improvement Project. As a service evaluation it does not require research ethics permission.
- The UKROC database is house at Northwick Park Hospital and overseen by a steering group of the British Society of Rehabilitation Medicine (BSRM)

Analysis of PCAT data

- UKROC database
  - Extract April 2010-Dec 2014
    - If PCAT scores entered – N=5396
  - Demographics

Parameter	Results
Males:Females	58:42%
Age	Mean 54.4 (sd 18.2)
Length of stay	78 days (sd 67)
Diagnosis	
Brain injury	66.4%
Spinal cord injury	9.4%
Peripheral	5.0%
Progressive	9.9%

Total PCAT by Service level



Linear regression

- Stepwise linear regression models
  - To identify principal items in PCAT
    - That are strongest predictors of total PCAT score

Level 1a only Item	Adjusted R Square
Communication	0.48
Staff emotional	0.69
Intensity	0.79
Swallow	0.84
Discharge planning	0.87
Medico-legal	0.89
Medical	0.91

Level 1c only Item	Adjusted R Square
Staff emotional load	0.55
Discharge planning	0.73
Facilities	0.81
Communication	0.88
Vocational Rehab	0.91
Intensity	0.93
Mood	0.95

In summary

- The total PCAT score
  - Provides reasonable separation between levels
    - A total score of 26-27 may be a better cut-off point than 30

- Ten items predict >90% of the total PCAT score:

Strongest predictors	Other predictors
Emotional load on staff	Medico-legal
Communication	Swallow
Intensity	Medical needs
Discharge planning	Moods
Specialist Facilities	Vocational rehabilitation