

Improving the quality of operative notes by implementing a new electronic template for upper limb surgery at the Royal Derby Hospital.

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Abstract

The RCS has published clear and succinct guidelines dictating the necessity for the documentation of legible and timely surgical operative notes and exactly what should be included.

A baseline study within the upper limb unit at our trust showed a 71.1% adherence with the RCS guidelines with an average delay of typing of notes after dictation was 11.6 days. This quality improvement project designed and developed a bespoke electronic surgical notes template built within an existing database driven software within the Trust. After implementation of the templates we found no delays in full operative notes being typed and a 100% adherence with the RCS guidelines. This project significantly improved the quality and timely production of electronic surgical notes within a sustainable electronic software solution.

Problem

Accurate and timely documentation in clinical medicine is essential for delivering safe patient care. Comprehensive documentation is also important for research, audit, and quality improvement purposes. Medical notes also form the main body of the clinician's defence should a medico-legal issue arise.

There is currently a delay between the time of dictation of operative details to the time it enters the patients notes. Currently only a brief handwritten summary of the procedure and post operative instructions are documented in the patients notes in real time before the full detailed operative notes are typed and filed in the notes at a later date. Subsequently nursing and physiotherapy staff have limited information to work from which may lead to suboptimal post operative rehabilitation, poor communication, and may lead to subsequent errors.

Background

Previous work have shown improvements in the quality of operative notes by using a surgical electronic database[1-3]. The aim of such a database is to produce clear concise operation notes which allow communication and the continuation of care during the handover of patients, from the operation room to the recovery phase.

Often hand written operation notes can be difficult to read, notes can get lost and then the Hospital Trust may not get accurately paid for the procedures which it is undertaking.

Electronic surgical notes have been used in a number of different hospital trusts but are not routinely used in our department. Although operative details are typed after dictation and filed in the notes there is still a delay in relaying the operative details such as wound closure and antibiotics used to the recovery staff and nurses

on the ward. Additionally there is time and resource pressures on secretarial support for typing operative notes which affect the timely production of typed notes and increase the potential costs to the trust. There have been a number of quality improvement projects that have utilised the use of electronic templates[4-6] although none have developed a sustainable, integrated, and comprehensive electronic operative notes template.

The aim of this project is to design and develop an electronic operation note templates based on the existing Information Technology (IT) software database used at the Trust. We hope to provide a more accurate, detailed, and timely production of a typed set of operative notes that is filed immediately into the patients case notes. Furthermore we aim to link the ICD-10 diagnosis codes, comorbidities, and operations codes therefore providing more accurate coding leading to appropriate remuneration for procedures undertaken in the Trust.

The design of the surgical templates will allow easy audit of the procedures undertaken at the trust therefore adhering to the clinical governance framework.

Baseline measurement

In this project baseline measurements include the time taken to type up the operation note measured in days. The adherence to the Royal College of Surgeons of England (RCS) guidelines on operation notes.[7] Specifically this included the adherence to the following details contained in the operation notes:

1. Date
2. Name of Surgeon
3. Name of Anaesthetist
4. Operation title
5. Operation findings
6. Details of operation

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7. Closure details
8. Antibiotics
9. DVT prophylaxis
10. Post operative instructions
11. Signature

See supplementary file: ds6210.pdf - "Fig 1. Bespoke shoulder arthroscopy template software layout"

Design

When considering a typed electronic operative notes a number of initial ideas were considered including simply using a template saved on a word processor and edited and printed as required. These word processor files could then be saved in folders on the Trusts computers. Other ideas included pre-printed surgical templates with simple tick boxes. However neither of these ideas was deemed sustainable.

The agreed intervention was to develop a shoulder arthroscopy and arthroplasty surgical notes template in conjunction with members of the shoulder and upper limb unit at the Royal Derby Hospital and Information Technology (IT) staff at the Trust and departmental secretaries. The Trust have licensed the Inflex software (CIMS) for Cancer and Trauma & Orthopaedic services at the hospital for the last four years.

We decided that designing and building the operation notes database within the Inflex IT infrastructure would allow a sustainable change and make any future changes more rapid and cost effective as no further funding would be required to build the surgical operation notes template. This was possible as we used existing IT software which allows further functionality to be built in without extra software licence costs. We would save on costs of secretarial typist currently employed to type dictated operative notes. It will provide rapidly searchable data for audit and research purposes.

The agreed intervention was that the finalised forms would be available on inflex. All surgeons have access to data entry privileges on the Inflex software and operative templates. Existing hardware such as computers and printers are to be used. We have requested that the Inflex software to be available on all computers in the operating theatres and surgeons dictation office with ability to print the operative notes.

The details of the templates were based on consensus from the surgeons, a literature search, and information from national databases such as the National Joint Registry (NJR). Close collaboration with the IT staff was necessary to design and develop the templates for accuracy and ease of use. The information and layout on screen and print required a number of design changes before "going live".

An initial trial run was undertaken to ensure that any glitches were ironed out. Also test run on data retrieval/analysis based on the templates were performed to ensure the software and database was correctly coding sections of the operative notes.

The surgical templates were taken to the shoulder and upper limb committee meeting for discussion and further refinement before full introduction. An example of one of the templates (shoulder arthroscopy) is shown in Fig 1. The print layout of this template which is subsequently filed into the patients case notes is shown in Fig 2. Templates on primary and revision shoulder and elbow arthroplasty as well as a generic upper limb template were created to capture all upper limb procedures performed in the unit.

Strategy

PDSA cycle 1: Initially a shoulder arthroscopy template was developed in conjunction with consultants and IT staff. A trial run with a "Test" patient was performed on the Inflex (CIMS) software in order to ensure that the correct information was displayed, functional, and reflected our aims. A number of formatting issues were ironed out and a preliminary template was developed and made "live" on the system to use with real patients.

PDSA cycle 2: After a number of correction and information changes and additions were made to the shoulder arthroscopy template was used in real patients. As result of this "real world" trial a number of challenges were highlighted. This was mainly in the form of hardware issues including access to computers, the software and printers in the theatres.

PDSA cycle 3: After going "live" with the template and a trial run was undertaken the template was unveiled at the Shoulder and Upper Limb Unit departmental meeting (Fig 1). A presentation of the template and a worked example using the software was demonstrated to all consultants and junior doctors who would be expected to engage with the system. Further comments and suggested improvements to the template were made and subsequently implemented. The refined and approved template was made available to all consultants within the unit.

See supplementary file: ds6218.pdf - "Fig 2. Print layout of the shoulder arthroscopy template"

Post-measurement

Data collected included the time taken for the full detailed operative notes to be typed and the percentage adherence of the operative notes to the RCS guidelines. Data was collected retrospectively after implementation after each PDSA cycle. Before implementation of the electronic operative notes template the average time taken for the operative notes to get typed was 11.6 days (range: 7-22 days). The adherence to RCS guidelines was 71.1% (Range: 63-72%). After introduction of the electronic template there was no delays (i.e. zero days) in typing notes as it was typed immediately after the procedure was performed and printed out into the patients notes. The adherence to RCS guidelines improved significantly to 91%. After some refinements such as including the DVT prophylaxis documentation the final PDSA cycle improved the compliance to 100% with continued no delays in typing of the operative notes (Fig 3).

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See supplementary file: ds6217.pdf - "Fig 3. Runtime charts looking at RCS compliance and typing delay"

Lessons and limitations

We learnt a number of lessons whilst undertaking this project. It was very important to engage a number of stakeholders. We worked very closely with the IT department to implement the electronic operation notes template. As this was built into the existing software infrastructure in the Trust and was used by a number of different employees we also had to engage staff such as secretaries, divisional managers, and doctors so that everyone was fully informed and understood the software. A number of meetings were undertaken with relevant stakeholders to develop ideas and disseminate the operative notes template. Before widespread implementation it was wise to test the new electronic template in a controlled environment. We were able to test and improve various features of the template in the publishing part of the software as well as testing the electronic interventions on a "test" patient before going live. Some feedback from doctors who used the template was that it took longer to complete the operative notes compared with dictating them. This was overcome by some "on the job" software training to speed access and familiarity of the template and software environment.

Conclusion

The initial problem of incomplete full operative notes being filed into patients case notes on the day surgery was improved by the generation of a high quality printed electronic operative notes the same day after the procedure was performed which conformed to the RCS guidelines. This therefore resulted in no delays in typing the full notes which was immediately available to all healthcare staff. The template also acted as an aide memoir so that all the relevant and key information was documented and was based on the RCS guidelines with specific upper limb details which we thought was important to document. This improved compliance with RCS guidelines from 71% pre template introduction to 100% post introduction of template. We created the electronic surgical templates on preexisting IT software (Infoflex) therefore making our solution sustainable and cost effective for the long term within our hospital trust. Furthermore our solution with the design of the templates and integration with the Infoflex software allows easy audit and query tools to search for specific diagnoses and procedures performed. Although not specifically analysed in this project we reflected that the design of the templates within this database driven software will improve coding with respect to diagnosis (ICD-10), comorbidities, and procedures (OPCS) potentially improving income to the trust.

Overall we were able to implement the electronic template across the upper limb department. Over a 4 month period 109 separate electronic notes were produced using the newly developed templates. The majority of consultants and junior doctors have engaged with the process and have actively used the templates although some have found it difficult to navigate the Infoflex software thus resulting in using the older dictation methods on

occasion. We envisage that further training may be required to use the software for some surgeons. The IT department have made enquiries about procuring a web based version of the software which will be more user friendly and easier to navigate and use.

This quality improvement (QI) project has developed a fully integrated electronic operative notes template that provides comprehensive details as outlined in the RCS guidelines with the added benefits of ICD-10 diagnosis, OPCS coding, and comorbidities on a single document. This is a very sustainable solution as its been built and integrated into the Trust approved software database. As far as the authors are aware this is the first QI project to encompass all these features into a single electronic platform and is a significant improvement on other studies in the literature[1-3]. The advantage of the current software is that all the templates developed will then directly convert to a web based version without a redesign of the existing templates. This highlights the continual nature of quality improvement and how we should constantly be reviewing our systems to ensure maximal efficiency and outcome.

References

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Declaration of interests

Nothing to declare

Acknowledgements

We would like to thank Gail Malek-Mohammadi and Wendy

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We would also like to thank the Upper Limb Consultants: Mr Amol Tambe, Mr Marius Espag, and Mr Tim Cresswell, Mr David Clark for their support and suggestions for improvements of the electronic templates.

Ethical approval

This project was an improvement study and not original research on human subjects. Local policy means that ethical approval was not required.

InfoFlex v5 Data Entry - Trauma and Orthopaedics

InfoFlex Module View Subject Event Summary Help

Hospital Number CR0020 Forename CR0060 Surname CR0050 Birth Date CR0100 Sex CR0090 NHS Number CR0010
20021974 TESTING TESTING 01/01/1952 F - Female

Data Entry --- Upper Limb Surgery (Surgery Date & Time = '22/06/2015 12:06:06')
Last changed by 'gail.malek' on 22/06/2015 at 12:07:27

x Hospital Number CR0020 | 20021974 Find Save

Screens Grid

Surgery (Upper Limb) Details

Surgeon and Anaesthetist

Surgery Date & Time 22/06/2015 12:06:06 Consultant
Operating Surgeon Anaesthetist
Assistant Surgeon Anaesthetist Other

Procedure Details

Surgery Template 3 - Shoulder Arthroscopy

Combined Procedure W88.9 - Z81.5 -
Combined Procedure 2
Combined Procedure 3

Comments

Procedures Using Non Combined Codes
(Historic procedure codes recorded prior to Combined procedure codes)

Procedure Code 1
Procedure Code 2
Procedure Code 3
Procedure Code 4
Procedure Code 5
Procedure Code 6

Add Operation Report

Reference

Author Code
Secretary Code
Responsible Consultant Code

Data View Design

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 - Miscellaneous Correspondence GP (r)
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 - Upper Limb Questionnaire Letter (r)
 - Linked Referral (r)
- Definitive Diagnosis and Clinical Summary
 - Fracture Liaison
 - DNA Letter(GP) (r)
 - Over 75 Letter (GP) (r)

Subject Overview

- Ward Round (21/04/2015 11:40:10)
- Upper Limb Surgery (11/06/2015)
- Upper Limb Surgery (18/06/2015 10:45:58)
- Referral (28/04/15 :: U :: RTG000000000000263664 ::
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- Upper Limb Surgery (17/06/2015 11:36:01)
- Upper Limb Surgery (19/06/2015 12:12:11)
 - Operation Report (19/06/2015 12:15:30)
- Upper Limb Surgery (19/06/2015 12:42:54)
 - Operation Report (19/06/2015 12:46:09)
- Upper Limb Surgery (22/06/2015 12:06:06)
- Referral (30/06/15 :: U :: RTG000000000000301255 ::
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13:01
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Screens Grid

Shoulder Arthroscopy

Shoulder Arthroscopy (B)

Shoulder Arthroscopy Details

Operation Title

Antibiotics Anaesthesia Local Anaesthetic

Operating Position Shoulder Side Portals

Closure Dressings Sling

Preparation ASA Grade DVT Prophylaxis

Arthroscopic Findings

EUA

Rotator Cuff Tear Rotator Cuff Tear Size

Subscapularis Tear Biceps

SLAP Labral Tear

Frozen Shoulder Labral Tear Location

Calcific tendonitis Glenoid Cartilage

Subacromial Space

Humeral Cartilage

ACJ

Other

Additional Findings

Procedure

Procedure

Post Operative Instructions

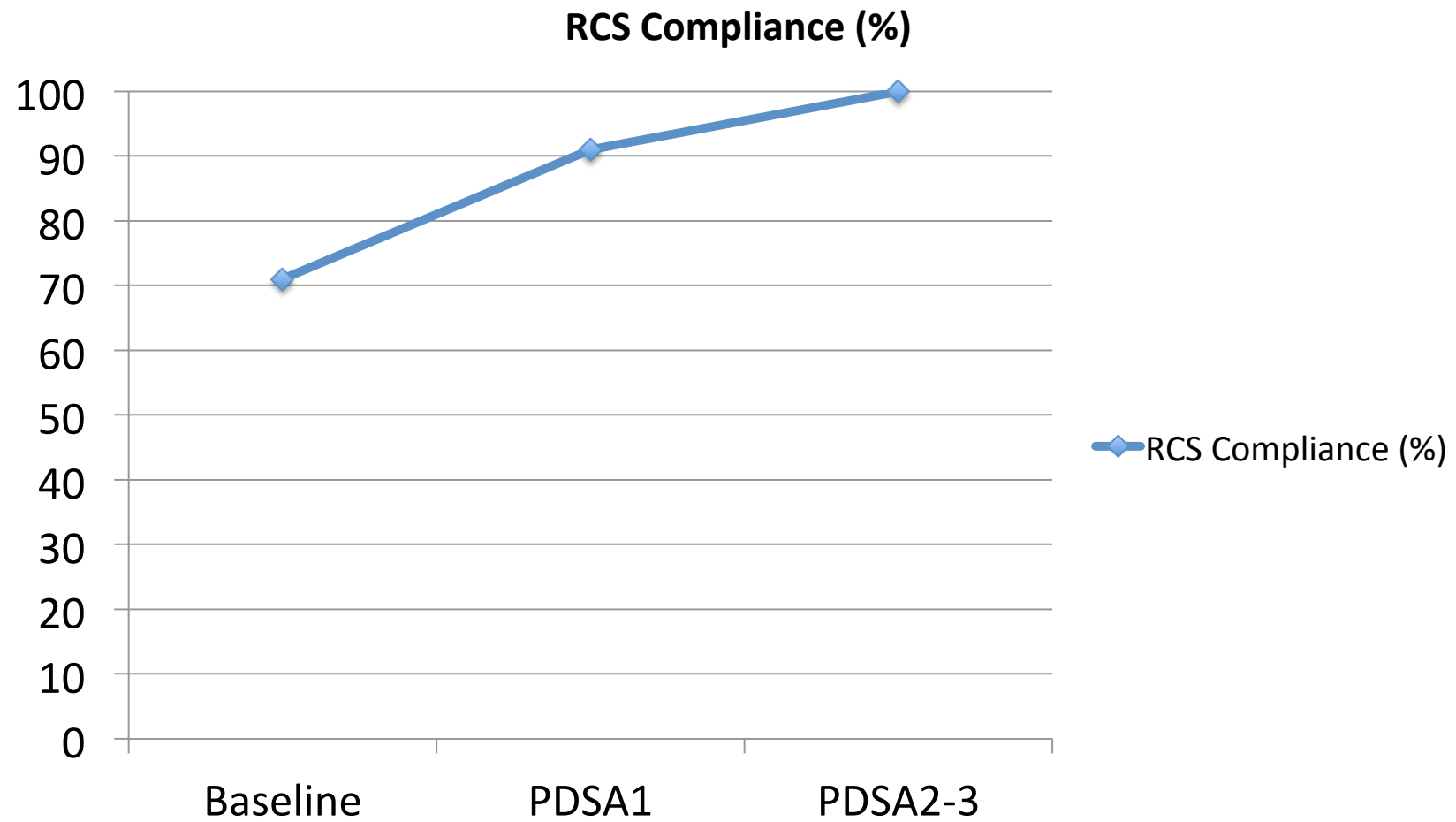
Sling Duration Clinic Follow Up

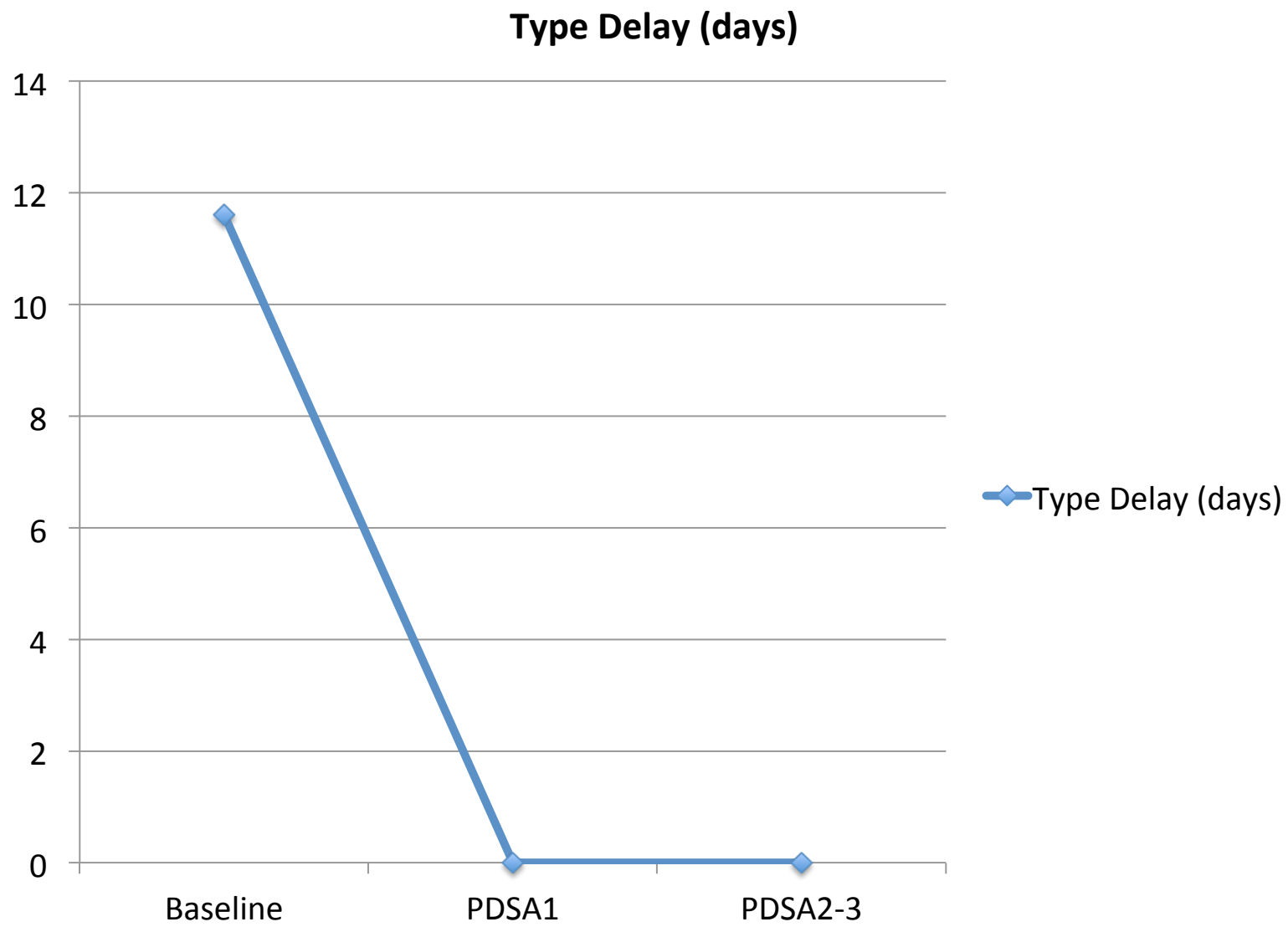
Physiotherapy Wound Check

Other Instructions

Surgery Details

13:00
22/09/2015





Operation Report – Right Shoulder Arthroscopy And Rotator Cuff Repair

Patient Details:	Testing Testing	DOB: 01/01/1952
H/N:	20021974	NHS No:
Date of Op:	22/05/2015	Consultant: DIC - Mr D I Clark FRCS (Orth)
Operating Surgeon:	K. Theivendran	Assistant: A. Firth
Anaesthetist:	C5205046 - Dr Am Saxena	
Diagnosis:	M75.0 - Rotator cuff tear	
Procedure:	116 - ASD + 1 tendon (small) cuff repair (arthroscopic) O29.1 - Y76.7 - T79.1 -	
Co Morbidities:	I20.9 - Angina Pectoris G30.0 - Alzheimer's Disease With Early Onset G30.9 - Alzheimer's Disease	

Shoulder Arthroscopy Details

Antibiotics:	Iv Cefuroxime 1.5g
Anaesthesia:	General
Local Anaesthetic:	10ml 0.5% Bupivacaine with 1:200:000 adrenaline to portal sites
Operating Position:	Beach Chair
Shoulder Side:	Right
Preparation:	Alcoholic Povidone Iodine + DHS Drape
Portals:	On Demand
Closure:	Steristrips
Dressings:	Melonin, Wool Pad & Slick
Sling:	Polysling
ASA Grade:	2
EUA:	EUA:ER: 30 degrees EUA:FF: 60 degrees EUA:Other Details:

Shoulder Arthroscopy Findings

Rotator Cuff Tear: Supraspinatus	Rotator Cuff Tear Size: Medium (1-3cm)
Subscapularis Tear: Upper 25%	Biceps: Normal
Laberal Tear: No	Calcific Tendonitis: No
Frozen Shoulder: No	Humeral Cartilage: Normal
Glenoid Cartilage: Normal	Subacromial Space: A3 - Bare Bone Areas; B3 - Full Thickness Tear
ACJ: Normal	

Procedure

Subacromial Bursectomy Performed Using Arthrocare Wand 90. Footprint Prepared Using Shaver And 5.0mm Twinfix Ultrabraid Anchor Inserted. Medial And Lateral Mattress Sutures Applied And Cuff Edges Tied Down To Footprint. Water Tight Closure. Subacromial Decompression Performed Using Bone Cutter Shaver To Anterolateral Acromion.

Post Operative Instructions

Sling Duration:	6 Weeks
Clinic Follow Up:	2 Weeks
Physiotherapy:	Cuff repair protocol
Wound Check:	48 hrs GP practice nurse

Consultant's Signature:.....**Date:** 11/06/2015

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Operating Surgeon Anaesthetist
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Shoulder Arthroscopy (B)

Shoulder Arthroscopy Details

Operation Title

Antibiotics Anaesthesia Local Anaesthetic

Operating Position Shoulder Side Portals

Closure Dressings Sling

Preparation ASA Grade DVT Prophylaxis

Arthroscopic Findings

EUA

Rotator Cuff Tear Rotator Cuff Tear Size

Subscapularis Tear Biceps

SLAP Labral Tear

Frozen Shoulder Labral Tear Location

Calcific tendonitis Glenoid Cartilage

Subacromial Space

Humeral Cartilage

ACJ

Other

Additional Findings

Procedure

Procedure

Post Operative Instructions

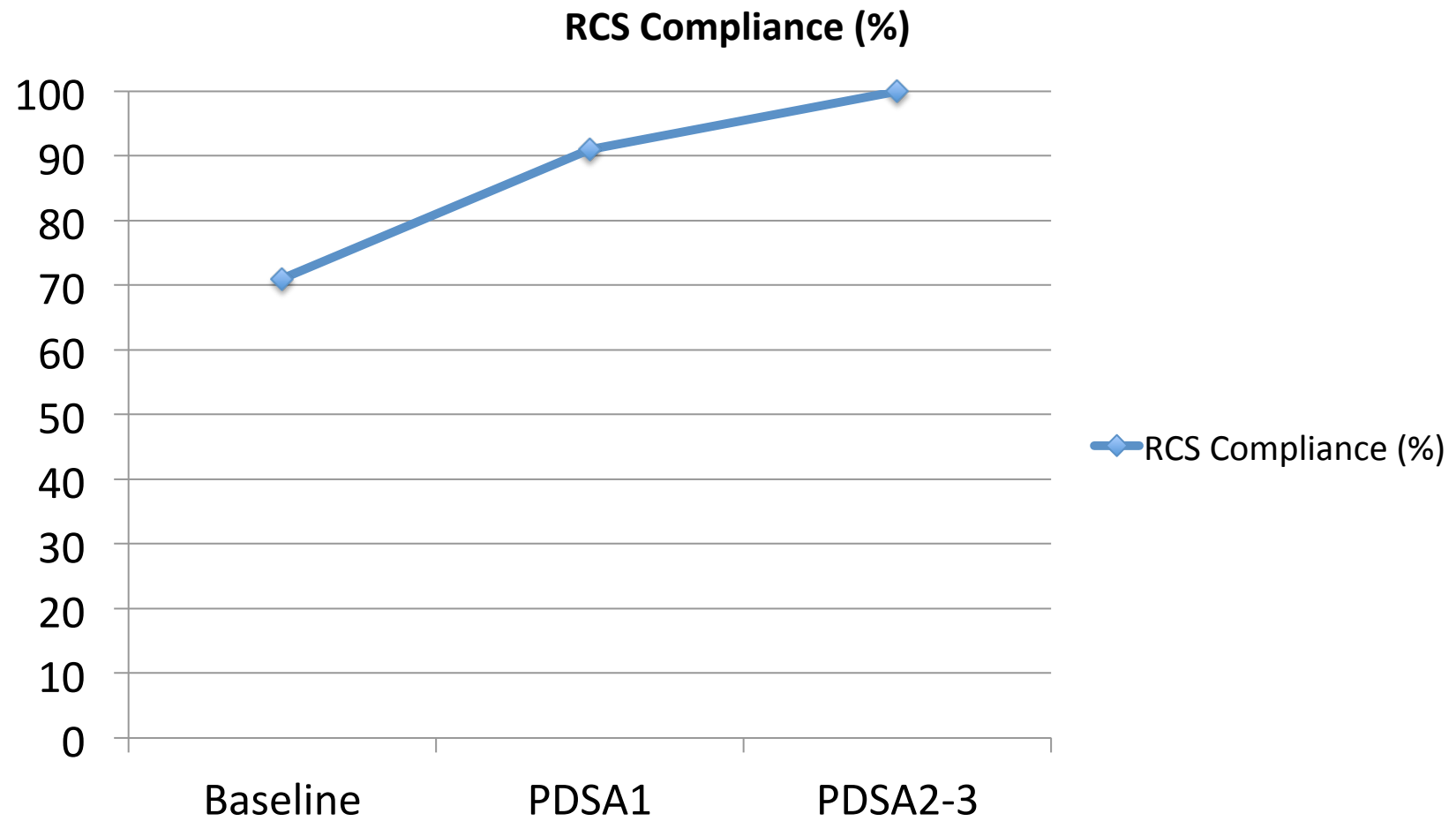
Sling Duration Clinic Follow Up

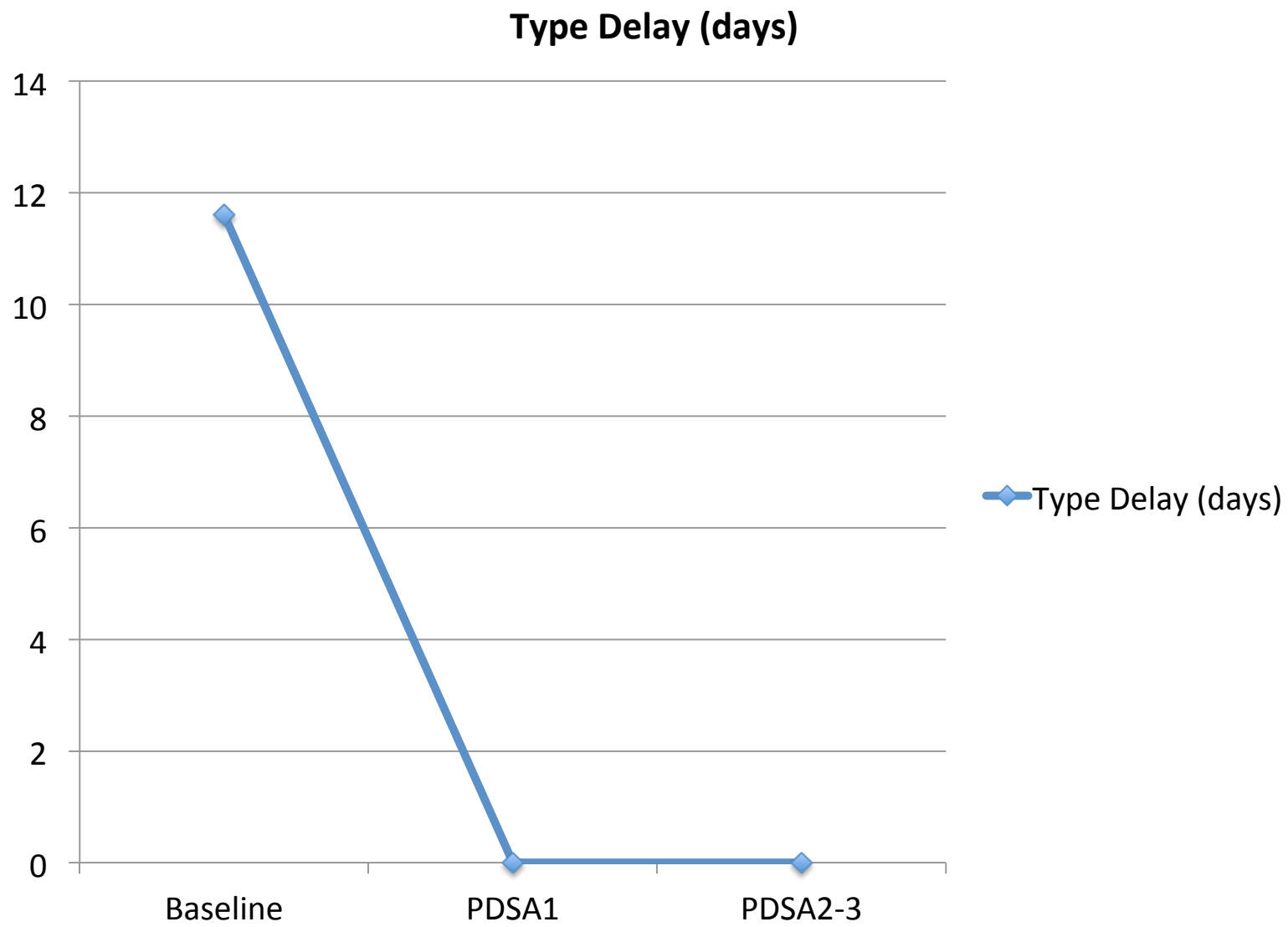
Physiotherapy Wound Check

Other Instructions

Surgery Details

13:00
22/09/2015





Operation Report – Right Shoulder Arthroscopy And Rotator Cuff Repair

Patient Details:	Testing Testing	DOB: 01/01/1952
H/N:	20021974	NHS No:
Date of Op:	22/05/2015	Consultant: DIC - Mr D I Clark FRCS (Orth)
Operating Surgeon:	K. Theivendran	Assistant: A. Firth
Anaesthetist:	C5205046 - Dr Am Saxena	
Diagnosis:	M75.0 - Rotator cuff tear	
Procedure:	116 - ASD + 1 tendon (small) cuff repair (arthroscopic)	O29.1 - Y76.7 - T79.1 -
Co Morbidities:	I20.9 - Angina Pectoris	
	G30.0 - Alzheimer's Disease With Early Onset	
	G30.9 - Alzheimer's Disease	

Shoulder Arthroscopy Details

Antibiotics:	Iv Cefuroxime 1.5g
Anaesthesia:	General
Local Anaesthetic:	10ml 0.5% Bupivacaine with 1:200:000 adrenaline to portal sites
Operating Position:	Beach Chair
Shoulder Side:	Right
Preparation:	Alcoholic Povidone Iodine + DHS Drape
Portals:	On Demand
Closure:	Steristrips
Dressings:	Melonin, Wool Pad & Slick
Sling:	Polysling
ASA Grade:	2
EUA:	EUA:ER: 30 degrees EUA:FF: 60 degrees EUA:Other Details:

Shoulder Arthroscopy Findings

Rotator Cuff Tear: Supraspinatus	Rotator Cuff Tear Size: Medium (1-3cm)
Subscapularis Tear: Upper 25%	Biceps: Normal
Laberal Tear: No	Calcific Tendonitis: No
Frozen Shoulder: No	Humeral Cartilage: Normal
Glenoid Cartilage: Normal	Subacromial Space: A3 - Bare Bone Areas; B3 - Full Thickness Tear
ACJ: Normal	

Procedure

Subacromial Bursectomy Performed Using Arthrocare Wand 90. Footprint Prepared Using Shaver And 5.0mm Twinfix Ultrabraid Anchor Inserted. Medial And Lateral Mattress Sutures Applied And Cuff Edges Tied Down To Footprint. Water Tight Closure. Subacromial Decompression Performed Using Bone Cutter Shaver To Anterolateral Acromion.

Post Operative Instructions

Sling Duration:	6 Weeks
Clinic Follow Up:	2 Weeks
Physiotherapy:	Cuff repair protocol
Wound Check:	48 hrs GP practice nurse

Consultant's Signature:.....**Date:** 11/06/2015

InfoFlex v5 Data Entry - Trauma and Orthopaedics

InfoFlex Module View Subject Event Summary Help

Hospital Number CR0020 Forename CR0060 Surname CR0050 Birth Date CR0100 Sex CR0090 NHS Number CR0010
20021974 TESTING TESTING 01/01/1952 F - Female

Data Entry --- Upper Limb Surgery (Surgery Date & Time = '22/06/2015 12:06:06')
Last changed by 'gail.malek' on 22/06/2015 at 12:07:27

x Hospital Number CR0020 | 20021974 Find Save

Screens Grid

Surgery (Upper Limb) Details

Surgeon and Anaesthetist

Surgery Date & Time 22/06/2015 12:06:06 Consultant
Operating Surgeon Anaesthetist
Assistant Surgeon Anaesthetist Other

Procedure Details

Surgery Template 3 - Shoulder Arthroscopy

Combined Procedure	W88.9 -	Z81.5 -			
Combined Procedure 2					
Combined Procedure 3					

Comments

Procedures Using Non Combined Codes
(Historic procedure codes recorded prior to Combined procedure codes)

Procedure Code 1	
Procedure Code 2	
Procedure Code 3	
Procedure Code 4	
Procedure Code 5	
Procedure Code 6	

Add Operation Report

Reference

Author Code	
Secretary Code	
Responsible Consultant Code	

Data View Design

- Patient Demographic details
 - Miscellaneous Correspondence Patient (r)
 - Miscellaneous Correspondence GP (r)
 - Fracture Liaison Misc Correspondence (GP) (r)
 - Fracture Liaison Service Misc correspondence (Patient)
 - Operation History (r)
- Referral (r)
 - Miscellaneous Correspondence GP (r)
 - Miscellaneous Correspondence Patient (r)
 - Upper Limb Questionnaire Letter (r)
 - Linked Referral (r)
- Definitive Diagnosis and Clinical Summary
 - Fracture Liaison
 - DNA Letter(GP) (r)
 - Over 75 Letter (GP) (r)

Subject Overview

- Ward Round (21/04/2015 11:40:10)
- Upper Limb Surgery (11/06/2015)
- Upper Limb Surgery (18/06/2015 10:45:58)
- Referral (28/04/15 :: U :: RTG000000000000263664 ::
- Linked Referral (28-04-15 :: U :: 2015E0091660 ::
- Definitive Diagnosis and Clinical Summary
- IP (28/04/2015)
 - IP Transfers (28/04/2015 :: CT1)
 - IP Transfers (29/04/2015 :: CT2)
- Upper Limb Surgery (22/05/2015)
 - Operation Report (11/06/2015 10:59:51)
- Upper Limb Surgery (28/05/2015)
- Upper Limb Surgery (10/06/2015)
- Upper Limb Surgery (16/06/2015)
 - Operation Report (16/06/2015 13:30:25)
- Upper Limb Surgery (17/06/2015)
- Upper Limb Surgery (17/06/2015 10:20:24)
- Upper Limb Surgery (17/06/2015 11:09:33)
- Upper Limb Surgery (17/06/2015 11:34:39)
- Upper Limb Surgery (17/06/2015 11:36:01)
- Upper Limb Surgery (19/06/2015 12:12:11)
 - Operation Report (19/06/2015 12:15:30)
- Upper Limb Surgery (19/06/2015 12:42:54)
 - Operation Report (19/06/2015 12:46:09)
- Upper Limb Surgery (22/06/2015 12:06:06)
- Referral (30/06/15 :: U :: RTG000000000000301255 ::
- Linked Referral (30-06-15 :: U :: 2015E0142863 ::
- Definitive Diagnosis and Clinical Summary
- Referral (30/06/15 :: R :: RTG000000000000301258 ::
- Linked Referral (30-06-15 :: R :: 2015E0142866 ::
- Definitive Diagnosis and Clinical Summary
- Operation History (30/03/2015 09:36:10 :: DIC :: 1 :: U
- Operation History (30/03/2015 09:37:58 :: DIC :: 2 :: U

InfoFlex v5 Data Entry - Trauma and Orthopaedics

InfoFlex Module View Subject Event Summary Help

Trauma and Orthopaedics

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Last changed by 'gail.malek' on 22/06/2015 at 12:07:27

Hospital Number CR0020 20021974

Screens Grid

Shoulder Arthroscopy

Shoulder Arthroscopy (B)

Shoulder Arthroscopy Details

Operation Title

Antibiotics Anaesthesia Local Anaesthetic

Operating Position Shoulder Side Portals

Closure Dressings Sling

Preparation ASA Grade DVT Prophylaxis

Arthroscopic Findings

EUA

Rotator Cuff Tear Rotator Cuff Tear Size

Subscapularis Tear Biceps

SLAP Labral Tear

Frozen Shoulder Labral Tear Location

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Procedure

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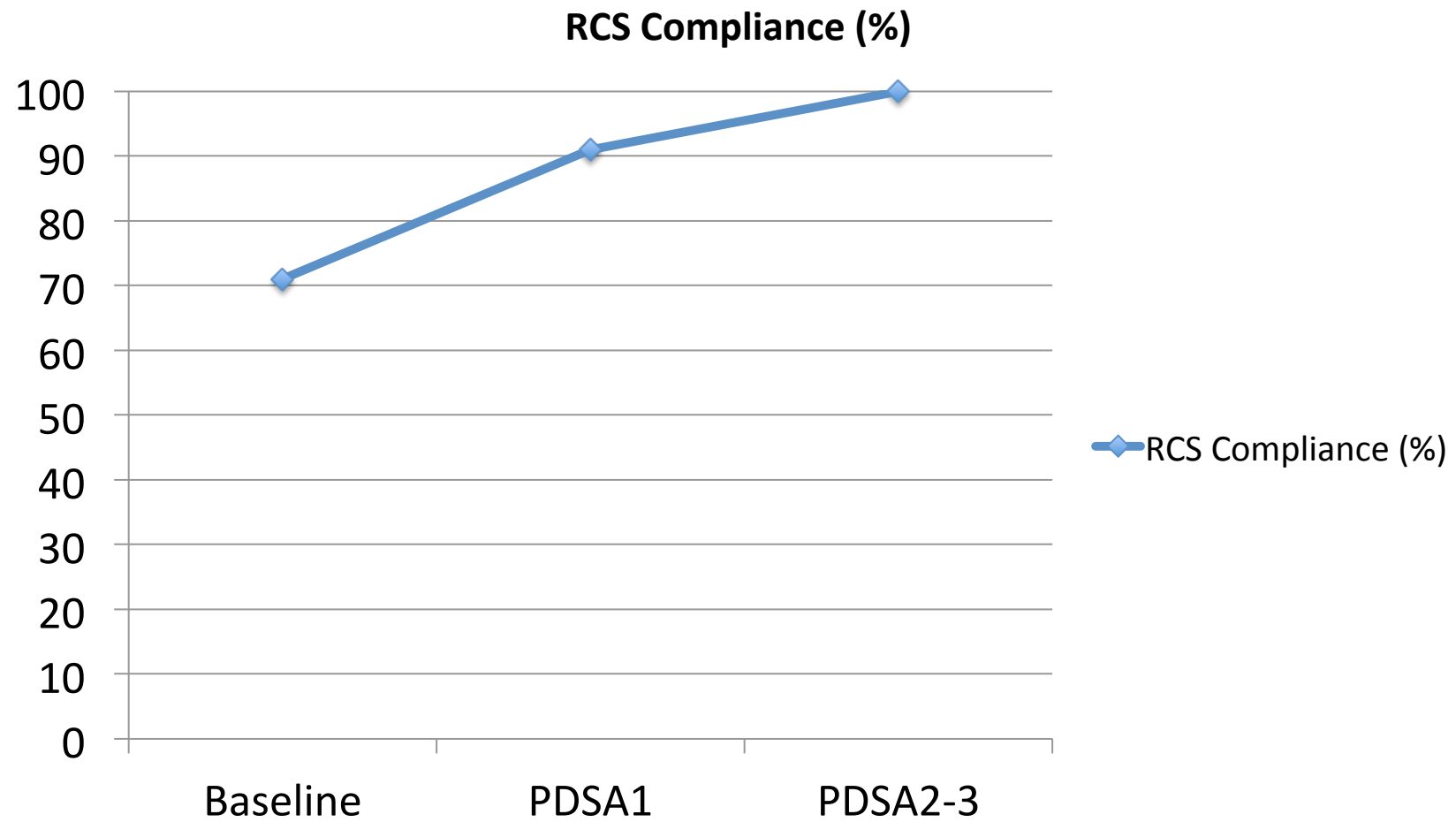
Sling Duration Clinic Follow Up

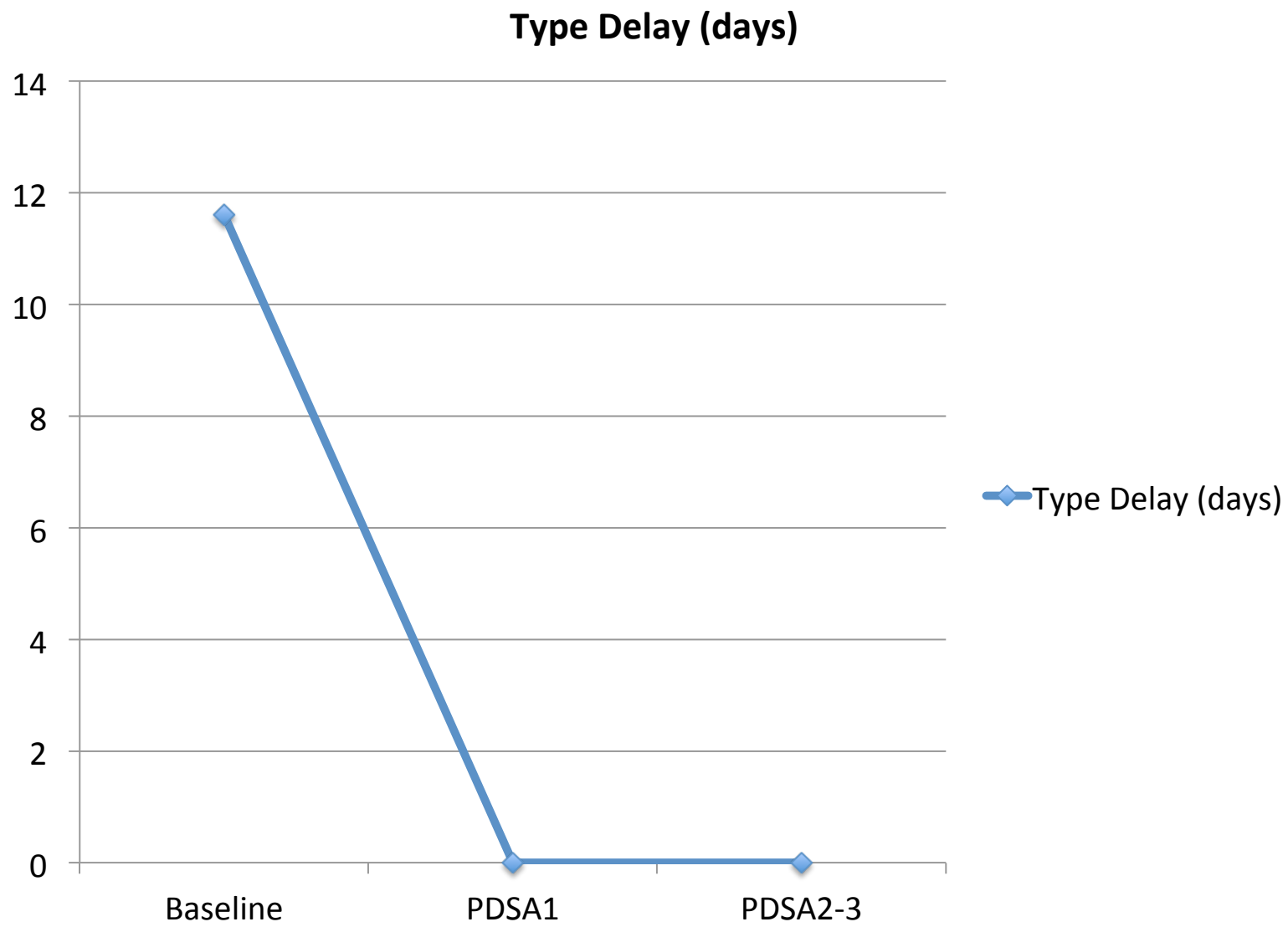
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