Appendix 1: Operation Procedure Codes included in Study

W15 1st Metatarsal Osteotomy, e.g. for Hallux Valgus	W19 Primary Open Reduction of Fracture with Intramedullary Fixation
W37 Total Hip Replacement, cemented	W20 Primary Open Reduction of Fracture with Extra medullary Fixation
W38 Total Hip Replacement, uncemented	W21 Primary Open Reduction of Intra-articular Fracture with Fixation
W39 Total Hip Replacement, other	W22 Other Primary Open Reduction of Fracture
W94 Total Hip Replacement, hybrid, cemented	W23 Secondary Open Reduction of Fracture
W95 Total Hip Replacement, hybrid, uncemented	W24 Closed Reduction of Fracture with Internal Fixation
W40 Total Knee Replacement, cemented	W25 Closed Reduction of Fracture with External Fixation
W41 Total Knee Replacement, uncemented	W46 Prosthetic Replacement of Head of Femur, cemented
W42 Total Knee Replacement, other	W47 Prosthetic Replacement of Head of Femur, uncemented
W43 Total Prosthetic Replacement of Other Joint, cemented	
W44 Total Prosthetic Replacement of Other Joint, uncemented	
W49 Humeral Head Replacement, cemented	
W50 Humeral Head Replacement, uncemented	
W59 Fusion of Toe Joint	
W60 Fusion of Other Joint	
W96 Total Shoulder Replacement, cemented	
W97 Total Shoulder Replacement, uncemented	
O06 Hybrid Total Shoulder Replacement, cemented humerus	
O07 Hybrid Total Shoulder Replacement, cemented glenoid	
O08 Hybrid Total Shoulder Replacement, both components cemented	
O21 Total Elbow Replacement, cemented	
O22 Total Elbow Replacement, uncemented	

Appendix 2: Example of using model to compute post-operative risk of AKI

In order to illustrate how to use the model to compute post-operative risk of AKI, we have used an example: a 70 year old diabetic man with baseline eGFR of 45 ml/min taking Ramipril and on 3 medicines in total with an ASA grade of 2 (see also appendix 3 for the same example in the excel risk calculator).

To compute his post-operative risk, his prognostic index (PI) has to be computed first. This is achieved by multiplying the estimated coefficients with the values of the predictor variables of the patient and taking the sum of these multiplications, added by the intercept of the model, see Table 2. Adding all B*X terms and the intercept results in a prognostic index of -0.786. Computation of a prognostic index with the current model can also be expressed as a general formula:

PI = -2.385 + 0.022*Age + (-0.708 if female) + (0.427 if diabetic) + (0.534 if on ACE inhibitor or Angiotensin receptor blocker) + (0.130 if 1 or 2 medicines) + (0.347 if 3 or more medicines) + (-1.417 if eGFR≥60) + (-1.108 if eGFR 45-59) + (-0.676 if eGFR 30-44) + (-1.037 if ASA=1) + (-0.141 if ASA=2) + (0.014 if ASA=3).

Filling out the example values of the predictor variables results in the same value for the PI:

PI = -2.385 + 0.022*70 + 0.427 + 0.534 + 0.347 – 1.108 – 0.141 = -0.786.

Since the prediction model is a logistic model post-operative risk of AKI can then be computed by:

Post-operative risk of AKI = exp(PI) / (1+exp(PI)).

Thus, in this example, the post-operative risk is of AKI is exp(-0.786)/(1+exp(-0.786))=0.46/1.46= 31.3%.

Appendix 3: Screenshot of excel risk calculator displaying formula using estimation results in development cohort (not recalibrated)

The formula bar for cell H14 displays:

$$=-2.385+(0.022*H6)+(-0.708*H7)+(0.427*H8)+(0.534*H11)+IF(H9<30,0,IF(H9<45,-0.676,IF(H9<60,-1.108,-1.417)))+IF(H10=1,-1.037,IF(H10=2,-0.141,IF(H10=3,0.014,0)))+IF(H12=0,0,IF(OR(H12=1,H12=2),0.13,0.347))$$

	AKI Risk Score Calculator		
	Age	70	
	Sex	0	insert "1" if Female
	DM	1	insert "1" if DM+
	CKDEPI eGFR	45	insert estimated eGFR
	ASA	2	insert ASA categories
	ACE_ARB	1	insert "1" if on ACE inhibitor
	No of Drugs	3	insert number of drugs
	Prognostic Index	-0.786	
	Risk of AKI (%)	31.3%	