Table S1: Extract from detailed 'case law' used to classify potential prescribing problems

Error code	Type of error	Error description	Examples
1	**unnecessary drug**		
1.1.1	Error: unnecessary drug.	prescription of a medication that is not clinically required and the evidence in the documentation is clear.	1)Helicobacter eradication treatment to a patient who is Helicobacter negative. 2)Terbinafine prescribed for a 2 week history of nail discolouration to right big toe. Treatment started without nail clippings being done as patient keen to treat blindly despite clear local guidance.
1.2.1	suboptimal : unnecessary drug	prescription of a past medication for a current indication without current clinical need.	1)3 fostair inhalers prescribed to a long term stable asthmatic patient who is currently not taking any preventer and uses salbutamol very rarely. No asthma review undertaken recently. Inhalers prescribed in case of need whilst travelling in India for six months.
2	**incorrect drug**		
2.1.1	Error : Incorrect drug	Incorrect drug chosen for clearly documented current clinical requirements. Includes all forms of medication.	1. hydrocortisone butyrate cream selected for use on child's face instead of standard hydrocortisone cream. 2)Gabapentin prescribed for costochondritis without trying any other possible analgesia including NSAIDs 3) steroid cream used without justification in a young child 4)very potent topical steroid prescribed without clinical reason 5) betnovate scalp application used in a 2 year old with cradle cap (not severe or resistant) without time limit
2.1.2	Error : Incorrect drug	Incorrect drug prescribed when stepping up or down therapy	1)flutiform 250 inhaler reduced to clenil 200 2pbd in an unstable asthmatic. 2)clenil started (after salbutamol) as a first line treatment for someone with possible COPD who was awaiting spirometry
2.2.1	suboptimal : incorrect drug	prescription of a second line antimicrobial therapy according to local antimicrobial guidelines without documentation to explain choice	1) second line H.pylori eradication treatment regimen prescribed. 2) clarithromycin prescribed to penicillin allergic patient with chesty cough in COPD when doxycycline would be preferred in guidelines and patient had successfully had this in the past
2.2.2	suboptimal : incorrect drug	prescribing a topical medication for an unlicensed indication where the possibility of harm from the product is unknown and alternatives are possible	1)ketoconazole shampoo in for a one year old with seborrhoeic dermatitis 2) ibuprofen gel for head injury resulting in headache and neck pain without stipulating for neck only and no other analgesic provided or recommended.
2.2.3	suboptimal : incorrect drug	prescription of a product that is likely to result in reduced adherence where more suitable alternatives options are available for the condition	1) lacri-lube ointment for a 15 year old presenting for the first time with a week long history of fry itchy eyes. Standard drops that do not cause blurred vision had not been tried.
2.2.4	suboptimal : incorrect drug	Prescription of an NSAID to someone with existing GI symptoms that MAY have been made worse when alternative NSAID given previously. Alternative analgesic options are available to the patient	1) Mefenamic acid for menorrhagia to patient already prescribed omeprazole 40mg twice daily and domperidone. notes state symptoms may have been worsened with previous naproxen use. Patient was on other regular analgesia at unknown amounts but other analgesic options or tranexamic acid was still available.
2.2.5	suboptimal : incorrect drug	prescription of an opioid analgesic where a non-opioid would be more appropriate	1) Tramadol prescribed as only analgesic for biliary colic. Patient would have been suitable for NSAID 2)Tamadol prescribed as alternative to codeine (which was causing patient to feel sick) for back pain no other analgesia prescribed including paracetamol.
2.2.6	suboptimal : incorrect drug	prescription of a medication that would not be recommended locally as an alternative to the recommended product because guidance for the recommended product could not be complied with	1)Amorolfine prescribed topically for suspected fungal nail as patient wanted treatment and results of clippings to prescribe terbinafine may not be known until after patient had gone travelling.
2.2.7	suboptimal incorrect drug	prescription of a restricted topical antimicrobial agent against local antimicrobial guidelines (but national guidelines suggest prescribed product)	1)Fusidic acid cream prescribed for impetigo when local guidelines advise topical polyfax for small area or oral flucloxacillin

Table S2: Examples of good practice highlighted by the pharmacist during the prescription review process

Area covered	Medicine details	Description	Reason example selected
Right Review	Aspirin Dispersible tablets 75mg - ONE TO BE TAKEN DAILY - 28	Medication review with patient who had recently finished TB treatment. Prescriber noticed non-adherence to aspirin. Patient did not realise needed it. Letter supports prescribing for at least 2 years.	Non-adherence noted and addressed. Referral to specialist letter to confirm prescribing.
Right Instructions	Citalopram 10mg Tablets - One taken each day for two weeks then one taken on alternate days for one week then stop. - 18	Citalopram prescribed as a reducing dose as cross tapering with mirtazepine. The dosage was very clear and well documented with the correct number of tablets given.	The prescriber's intentions were clear and the patient would understand the dosage.
Right Dose	Paracetamol Oral Suspension 120mg/5ml - 30-60mg To be taken three times a day - 100ml	Correct dosage added to a paracetamol prescription for a 9 week old.	Adding an age appropriate dose to paracetamol prescriptions helps patients to give the correct dose especially in children.

Area covered	Medicine details	Description	Reason example selected
Right Documentation	Cefalexin Capsules 500mg - One To Be Taken Twice A Day - 14	Patient presented with UTI and exacerbation of COPD. The patient had multiple allergies (penicillin, oxytetracycline, clarithromycin) and previous MC&S results showed resistance to trimethoprim and co-amoxiclav but sensitivity to cefalexin. (Penicillin allergy with unknown severity). There was very clear documentation of the thought process that led to cefalexin being prescribed.	The documentation was very clear as to the reason for the choice of antibiotic (which would not be in the local guidelines) and it would help another GP who reviewed the notes afterwards.
Right Drug	Lansoprazole 15mg Capsules - take one once daily (to protect the stomach) - 28	PPI prescribed to 78 year old who has been taking NSAID regularly OTC for ankle pain.	Prescriber noticed that OTC medication was causing GI risk and prescribed the correct dosage of PPI.

Area covered	Medicine details	Description	Reason example selected
Right Follow-up	Verapamil 80mg Tablets - Take TWO three times a day - 168	Verapamil prescribed at 160mg TDS for cluster headache. Patient requested further supply during consultation for tonsillitis. Prescriber checked regarding next follow up with GP and ECG. This was documented before supplying.	Verapamil is unlicensed for cluster headache and should be under specialist review. High doses are used for this indication. The prescriber questioned whether the patient was being followed up before supplying further medication.

Table S3: Examples of prescriptions with a prescribing problem by classification type				
Types of prescribing errors	**Prescription details**	**Description of the issue**	**Problem identified**	**Recommendation given to the GP in training**
Dose/strength error	Aciclovir Tablets 200mg - One to Be Taken Five Times A Day – 25 tablets	Patient presenting with shingles lesions on leg.	Dose of aciclovir prescribed is much lower than the recommended dose for shingles of 800mg five times a day for seven days. Effectiveness of the treatment is likely to be substantially reduced.	Take particular care when prescribing a medication that has numerous dosage schedules for various indications.
Frequency error	Morphine Oral Solutions 10mg/5ml - Take 2.5 to 5ml as required - 300ml	Prescription for a 30 week pregnant lady with no dosage frequency or maximum dose per day for a when required opioid.	Morphine crosses the placenta. Without complete dosage instructions the patient may inadvertently take the medication too frequently causing an unintentional overdose.	For when required medication, particularly those with a high potential for harm, always include a frequency to the dosage instructions.

Types of prescribing errors	Prescription details	Description of the issue	Problem identified	Recommendation given to the GP in training
Incorrect drug	Gabapentin 300mg Capsules - ONE TO BE TAKEN AT NIGHT increasing to one three times a day over the next three months – 84 capsules	Gabapentin prescribed for costochondritis when other medication options were available.	Gabapentin for at least three months is not the recommended treatment for costochondritis.	Ensure trusted reference sources are used to confirm management of conditions if necessary.
Formulation error	Salamol Easi-Breathe® Aerosol inhalation - inhale 2 doses as needed – 1 inhaler	A spacer was prescribed to be used with a breath-actuated inhaler	The inhaler device prescribed does not work with a spacer device and therefore a metered dose inhaler should have been prescribed.	Become familiar with the different inhaler devices available on your local formulary and the different techniques needed to obtain maximum effect.

Types of prescribing errors	Prescription details	Description of the issue	Problem identified	Recommendation given to the GP in training
Inadequate review	Salbutamol Aerosol inhalation 100mcg - inhale 2 doses as needed up to four times daily – 1 inhaler	Patient requesting a further supply of salbutamol for asthma. A total of 33 salbutamol inhalers had been issued in the last year and use had been highlighted over two months previously by the nurse. Inhaler issued and medication review coded without further discussion.	The national report into asthma deaths highlights that patients collecting 12 or more short-acting beta-agonist (SABA) inhalers are at increased risk of death. The collection history for salbutamol is an indicator of asthma control.	Use the issue history in the clinical system as an indicator of both reduced adherence and over-use.
Inadequate documentation in medical notes	Diazepam Tablets 2mg - take one as needed – 28 tablets	Patient attended with interpreter to discuss the outcome of a secondary care appointment, but communication had not yet been received. Diazepam prescribed for the first time without documenting the indication for the diazepam in the notes	The clinical indication or reasoning for prescribing a controlled drug was not documented in the clinical record.	Ensure the clinical indication and where necessary reasoning is clearly documented in the clinical record for all prescribing.

Types of sub-optimal prescribing	Prescription details	Description of the issue	Problem identified	Recommendation given to the GP in training
Information incomplete	Eumovate® 0.05% Ointment - As directed - 100g	Prescription of a moderately potent steroid cream for an adult without dosage instructions to state where and how often the cream should be used. Especially important as Dermovate® cream is co-prescribed.	Patient may apply the steroid cream at an incorrect frequency, to an incorrect area or get it confused with the Dermovate® that is co-prescribed.	Include application frequency on the dosage instruction for steroid cream. Where two steroid creams are co-prescribed it is particularly important to include the application area as well.
Inadequate documentation in records	Beclometasone Nasal spray 50mg - Two Sprays To Be Used In Each Nostril Twice A Day – 1 unit	Nasal spray issued during a consultation for sciatica. No reason given for the prescribing of a steroid nasal spray and it had never previously been prescribed.	Beclomethasone nasal spray is not a medication used in the management of sciatica and therefore there is no relevant indication in the records for the prescription	Ensure the clinical indication and where necessary reasoning is clearly documented in the clinical record for all prescribing.

Types of prescribing errors	Prescription details	Description of the issue	Problem identified	Recommendation given to the GP in training
Dose/strength error	Citalopram Tablets 10mg - take one daily – 56 tablets	Patient trying to reduce dose and currently taking 10mg on alternate days with a plan for further reduction. Dosage left as one daily resulting in the issue of four months' supply of medication at current dosage.	Dosage prescribed does not reflect dosage being taken and agreed at consultation.	Ensure all changes in dosage are updated on the prescription so that the patient and other health professionals are aware of the current dose.
Incorrect drug	Ibuprofen 10% Gel - apply Take Three times/day - 100g	Ibuprofen gel and ibuprofen tablets co-prescribed after a fall without any indication in the notes that they should not be used together.	Ibuprofen gel and tablets should not be used together.	Avoid the use of non-steroidal anti-inflammatory tablets and gel at the same time.
Formulation error	Estradot® 25mcg/24hrs Patches - USE two TWICE WEEKLY (MIRENA IS PROGESTOGEN ARM AND NEEDS RV MAY 2018) - 6x24	The patient is required to use two patches to achieve the recommended dosage when there is a 50mcgestradot patch which would only require one patch to be worn.	The use of the lower strength patch is making the regimen more complicated than necessary for the patient and has an increased cost for the NHS.	Use the available strength options when adjusting dosage.