

Prothrombin complex concentrates (PCC) are licenced for reversal of vitamin K antagonists (e.g. warfarin), with dosing based on patient body weight (kg) and INR (international normalised ratio) and can also be used to limit major bleeding in patients taking direct oral anticoagulants (DOAC). PCC products available in the UK are Beriplex (CSL Behring) and Octaplex (Octapharma). PCC is indicated in cases of life-, sight-, or limb-threatening bleeds and needs to be administered ideally within an hour of the decision to treat (outcomes are known to worsen if given >4 hours after admission). PCC is also indicated for reversal of anticoagulant where emergency surgery is required (although intravenous vitamin K reduces the INR within a few hours). Any delays in administration, particularly in intracranial haemorrhage (ICH) can lead to patient death or serious morbidity. Reporting of events relating to PCC to SHOT is encouraged. SHOT been collating these since 2014.

Trends in PCC SHOT reports – delays are common and contribute to deaths

Review of reports received between 2014 and 2025 identified 203 cases relating to errors with PCC.

Figure 1: Indication for PCC, 2014-2025

PCC was mainly indicated for ICH, haemorrhage and emergency surgery.

In several other cases, PCC was given for an incorrect indication.

In a small number of cases the reason for PCC was not evident in the report.

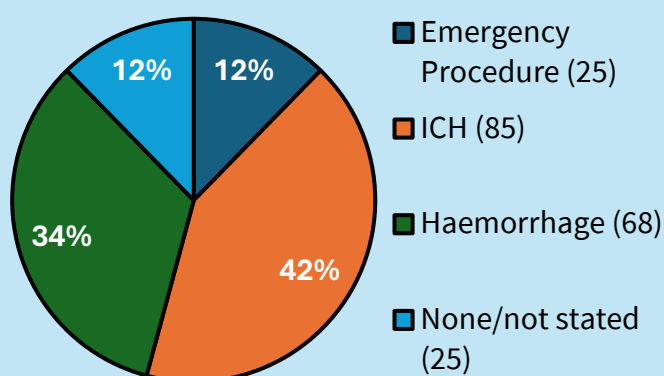
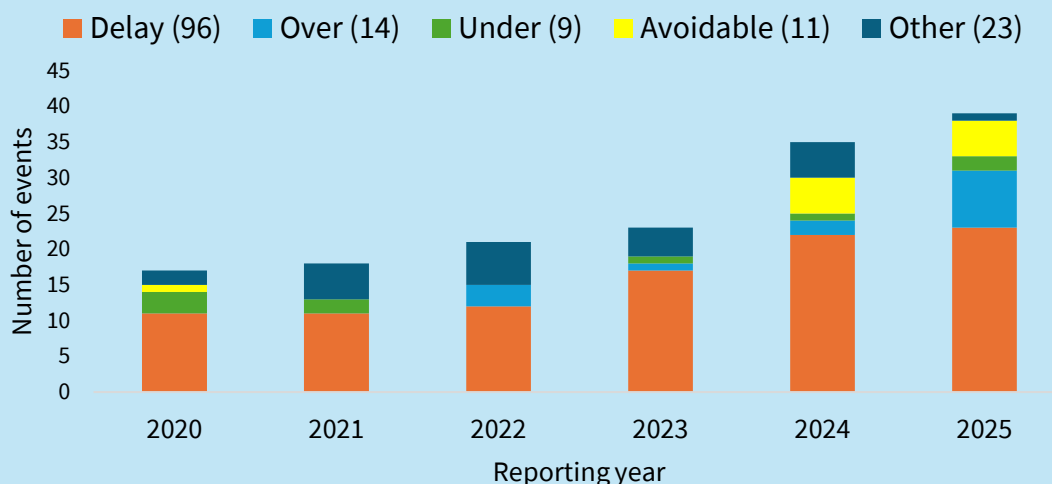


Figure 2: SHOT reporting category for PCC errors, 2020-2025

Reports of PCC-related errors have risen over the reporting period, predominantly due to delays. From 2020 to 2025, delays in administration contributed to 10 deaths (7 considered possible and 3 probable or definite). Under- and overdosing remain common sources of error.

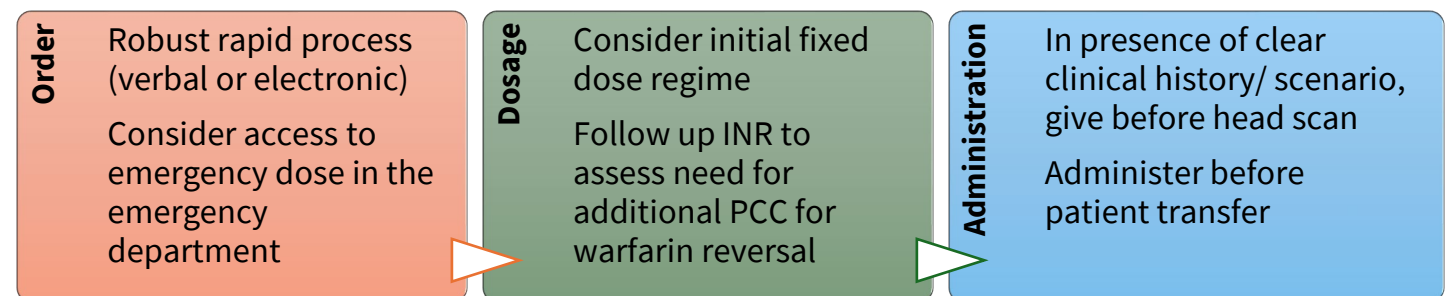


Note: the category 'other' includes clerical errors, incorrect lot numbers, rate errors, 'right blood right patient' errors and 'handling and storage' errors.

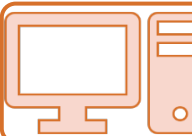
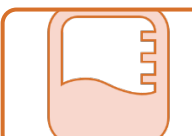
Common features of delays in PCC administration

Ordering and prescribing	• Lack of knowledge in clinical teams how to order/prescribe • Challenges with obtaining INR and patient weight
Approval	• Unnecessary referral to consultant haematologist • Difficulties/reluctance to contact consultant haematologist
Laboratory release	• Insufficient stock in low-use laboratories • Dose calculation using INR and weight
Administration	• Lack of understanding of the importance of rapid administration • Difficulties with reconstitution of the product, in particular the correct rate

Reducing delays



Key messages

-  Every second counts - delays in administration of PCC costs lives. Approval for use by a consultant haematologist should not delay provision in appropriate situations. Rapid access to emergency stock and fixed dosing should be considered to reduce delays in collection of this product. PCC must be given before patient transfer to scan room or another department.
-  Clear communication is key - processes for ordering PCC must be clear and should not contribute to delays. Ordering on electronic systems must include a call to the laboratory. Prescriptions must clearly state the dose to be administered. Vitamin K must be given in conjunction with PCC for warfarin reversal and the INR monitored.
-  Appropriate transfusion support – fresh frozen plasma is never appropriate for reversal of warfarin, particularly in cases of life-, sight-, or limb-threatening bleeds. Monitor INR following PCC use for warfarin reversal. Ensure PCC use, ordering and administration is covered in local policies and training. Training is also available from the PCC suppliers.

Further resources

NICE guideline on transfusion 2015:

[Recommendations for research | Blood transfusion | Guidance | NICE](#)

BSH guidelines:

[BSH guideline for anticoagulant reversal](#)

SmPC for PCC:

[Beriplex P/N 250 IU - Summary of Product Characteristics \(SmPC\) - \(emc\) | 6354](#) and

[Octaplex 500 IU powder and solvent for solution for injection - Summary of Product Characteristics \(SmPC\) - \(emc\) | 6566](#)

