

PRESEPSIN, A SOLUBLE CD14-SUBTYPE, INCREASES IN SEPTIC PATIENTS' PLASMA FROM PEDIATRIC DEPARTMENT.

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BACKGROUND

- CD14 is present in macrophage, monocyte, and granulocyte cell membranes. Its soluble fraction (soluble CD14-subtype), named **presepsin (P-SEP)** is present in blood in association with infections, due to phagocytosis of microorganisms¹⁾(Fig.1).
- Increased serum concentration of P-SEP was reported in adult patients with severe bacterial sepsis²⁾,³⁾, however, reports on pediatric patients have been limited⁴⁾.

MATERIALS and METHODS

- Sixty-one subjects (33 males, 28 females, 18 days to 152 months after birth, mean 3.9 years old) who admitted to our hospital were enrolled. Among them, blood culture was performed for 39 children.
- As control, six afebrile, non-septic children who admitted for routine cardiac catheter examinations for congenital heart anomaly were enrolled. Blood was withdrawn on admission.
- Plasma was obtained within 24 hours after blood withdrawal, stored at 4 Celsius degree until assays.
- P-SEP was assayed using PATHFAST™ (Fig. 2) chemiluminescent enzyme immunoassay system⁵⁾ (LSI Medience Inc, Tokyo, Japan). This automatic analyzer requires a 100 micro litter of plasma or whole blood for each assay, gives results within 20minutes⁶⁾.
- Together with P-SEP assays, blood culture, white blood cell count, serum C-reactive protein (**CRP**) and procalcitonin (**PCT**) were assayed. Local ethic committee approved this study.

RESULTS and DISCUSSION

- Presepsin concentration ranged 195 to 866 (median 372) pg/ml in patients whose blood culture was positive on admission (n=5).
- On the other hand, patients with blood culture negative (n=34) remained in low level, 82 to 770 (median 237) pg/ml (p=0.0501) (Fig. 3).
- Control subjects (n=6) showed significantly low concentration of P-SEP compared to blood culture positive children (p=0.0198), ranged 79.4 to 172 pg/ml (Fig. 3).
- Cases with positive in any bacterial culture showed higher concentration, whereas Influenza patients remained relatively low from 142 to 262 pg/ml (Fig. 4). P-SEP concentrations were 866, 195, 152 pg/ml in tracheobronchomalaria with MRSA, bacterial meningitis, bacterial inguinal lymphadenitis, respectively. Other eight cases with negative in bacterial culture, P-SEP concentration ranged 77 to 253 pg/ml.
- Generally, concentration of P-SEP quickly decreased after successful treatment of febrile disease with anti-microbial agents (Fig. 5).
- Plasma P-SEP in bacterial meningitis patient with *H.influenzae* (1 year 7 months old boy) decreased rapidly with administration of cefotaxime and meropenem when he was recovering (Figs 6a, b, c, d).
- P-SEP decreased in urinary tract infection with *E.coli* (nine month old boy) by administrating cefazolin (Figs 7a, b, c, d).
- Those findings suggest P-SEP is a sensitive indicator of successful treatment of sepsis, even in pediatric patients.
- Since presepsin has been reported to be an indicator of prognosis in adult patients with severe sepsis⁷⁾,⁸⁾, it could also be applied also to pediatric patients. According to our results, the reference interval seems to be much lower than previously reported in adults⁹⁾,¹⁰⁾ and neonates⁴⁾. Because number of subjects is limited, more study is required to confirm the result.

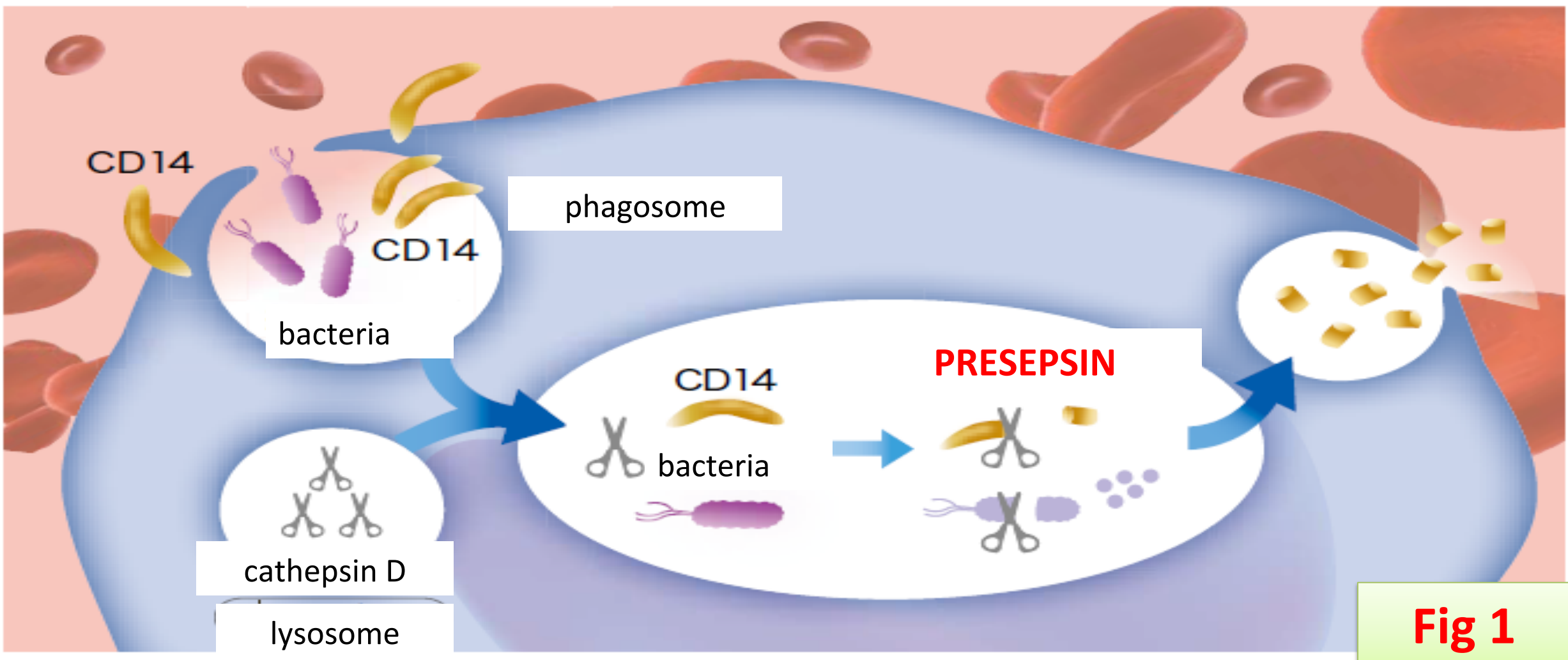
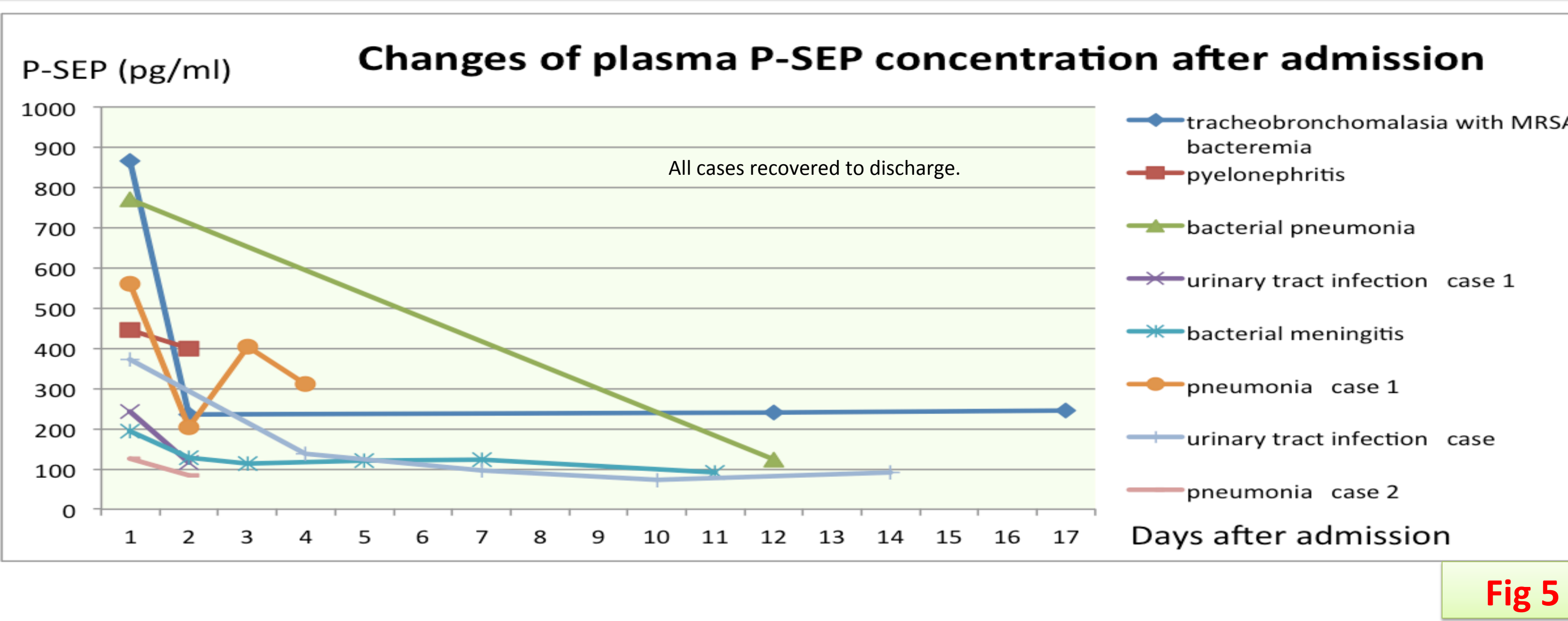
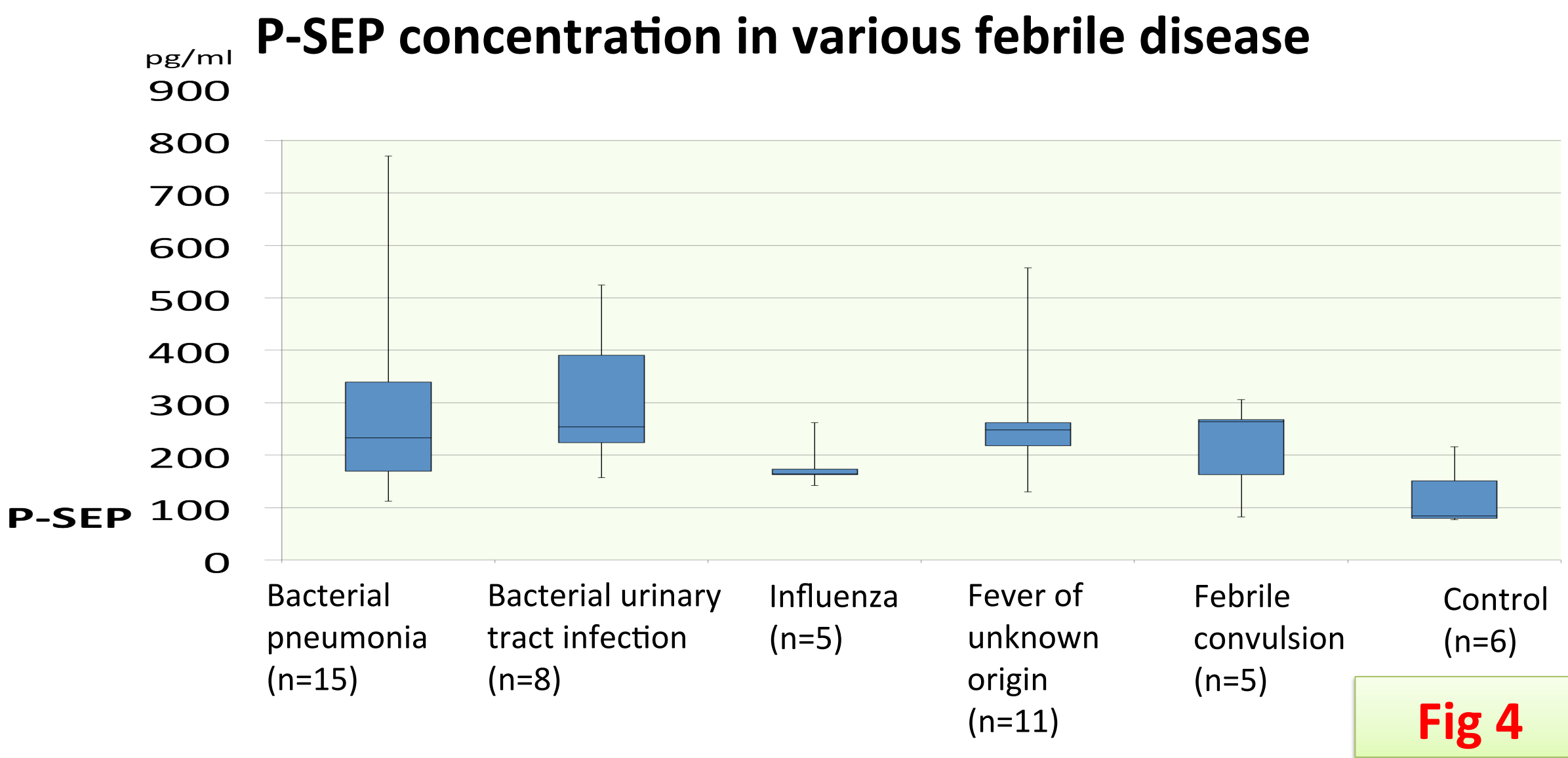
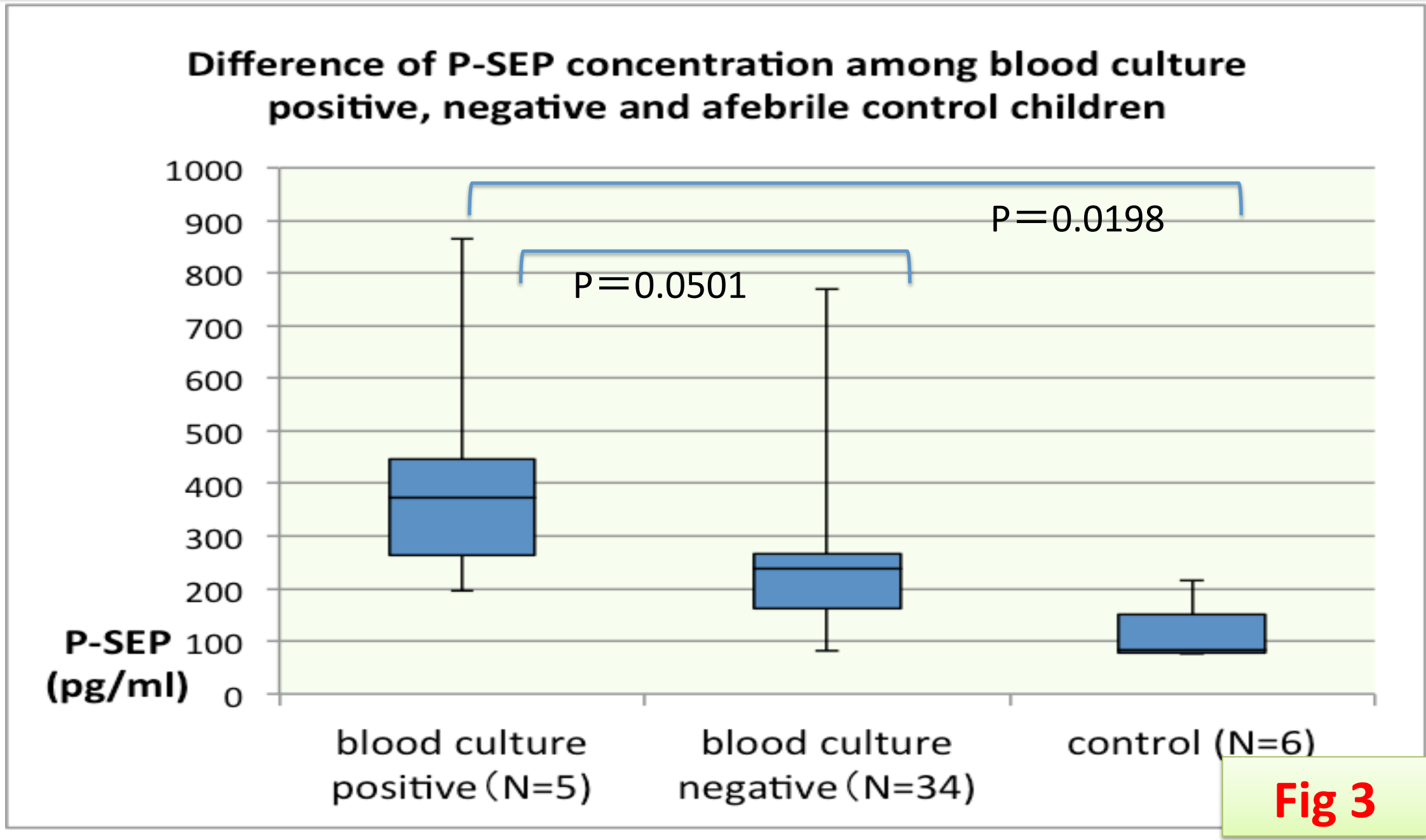


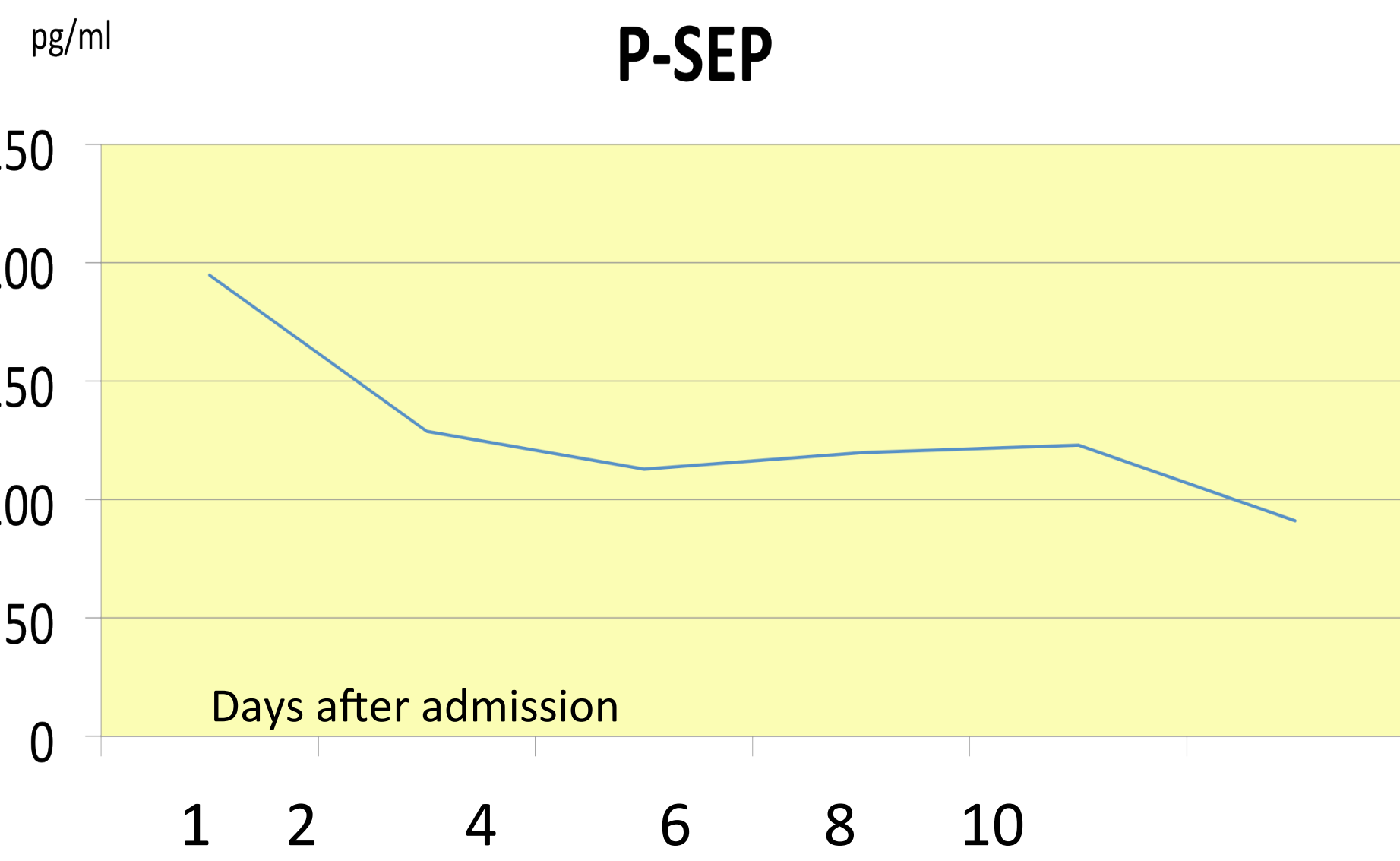
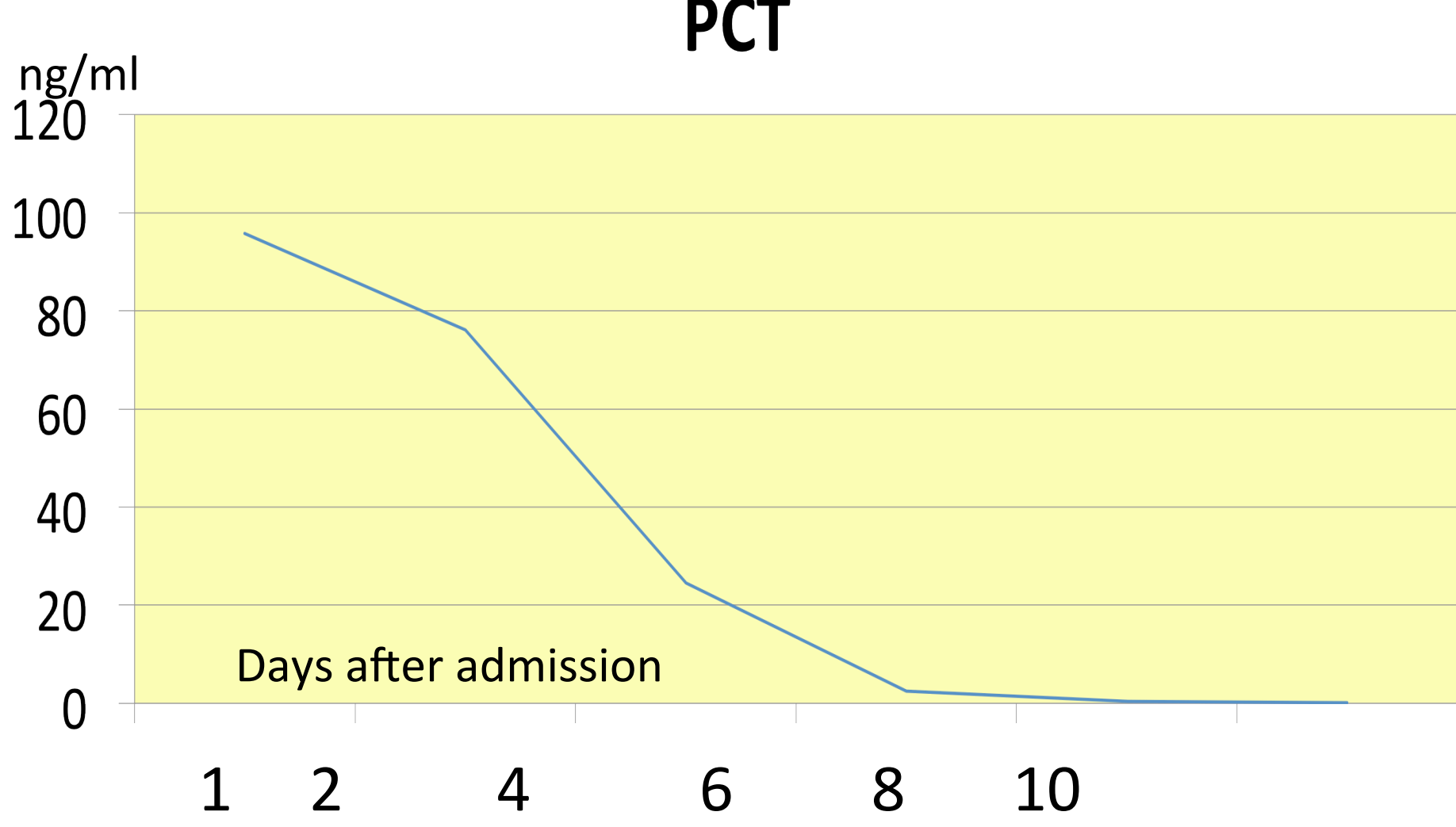
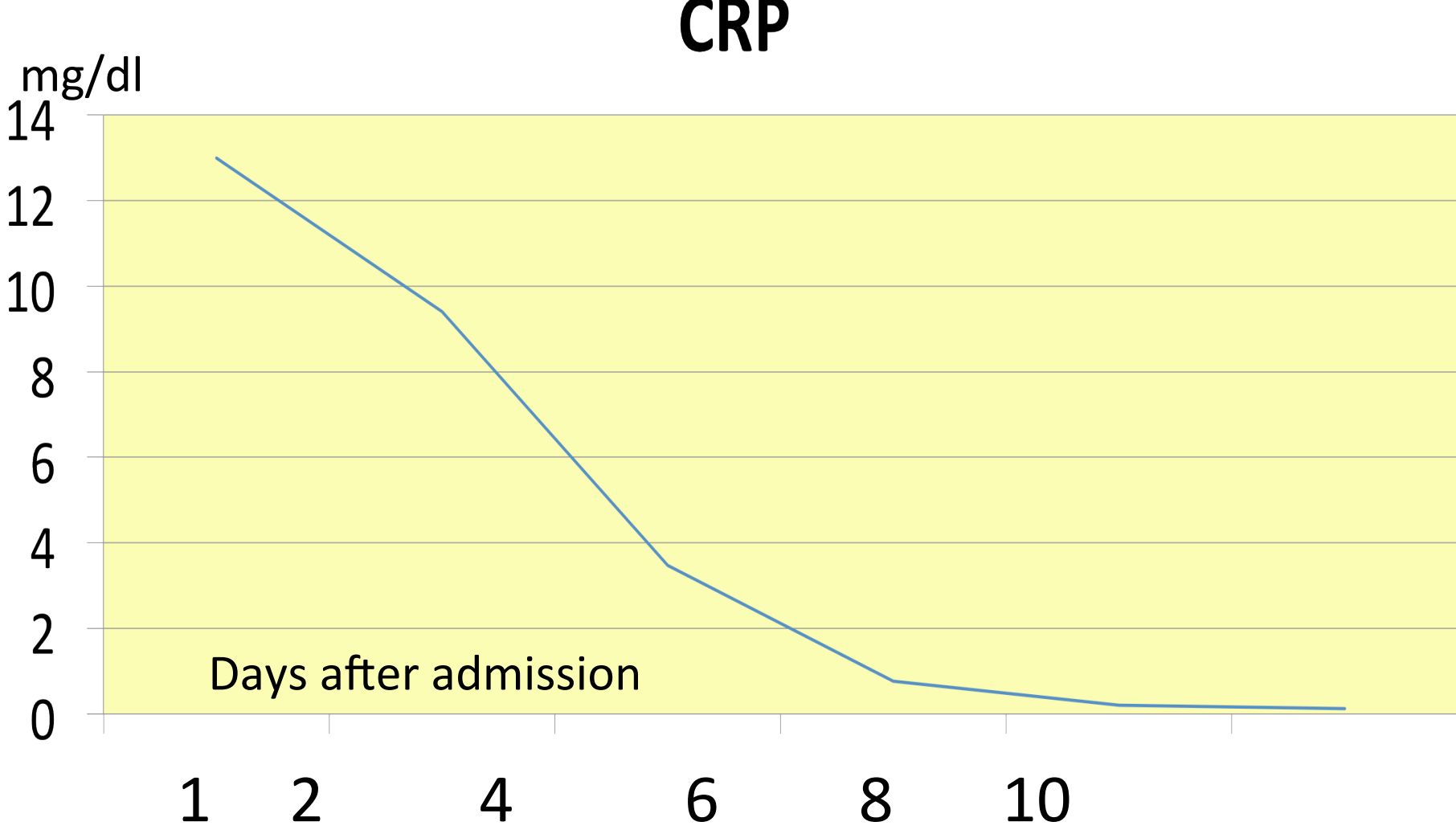
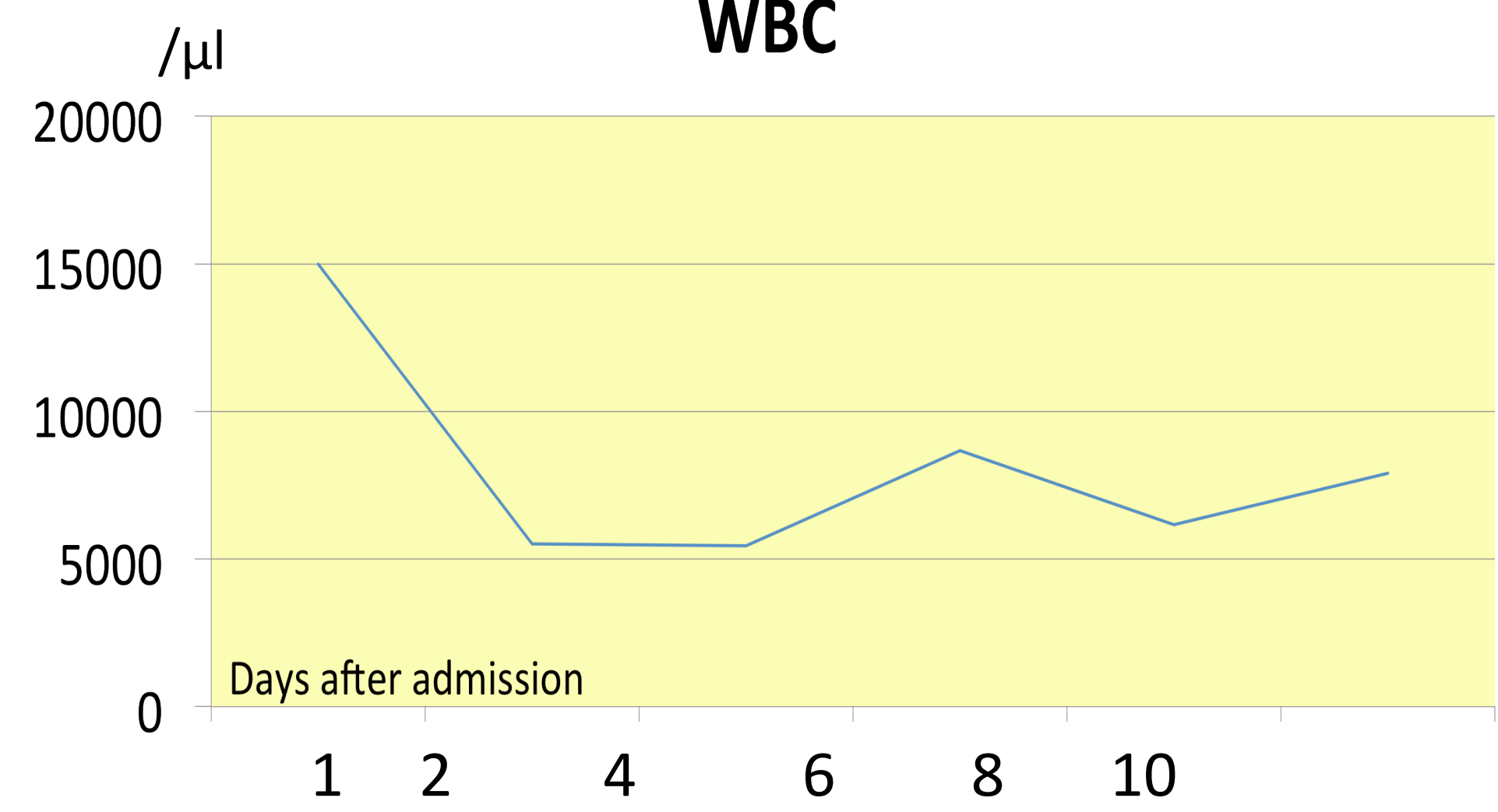
Fig 2

PATHFAST
autoanalyzer



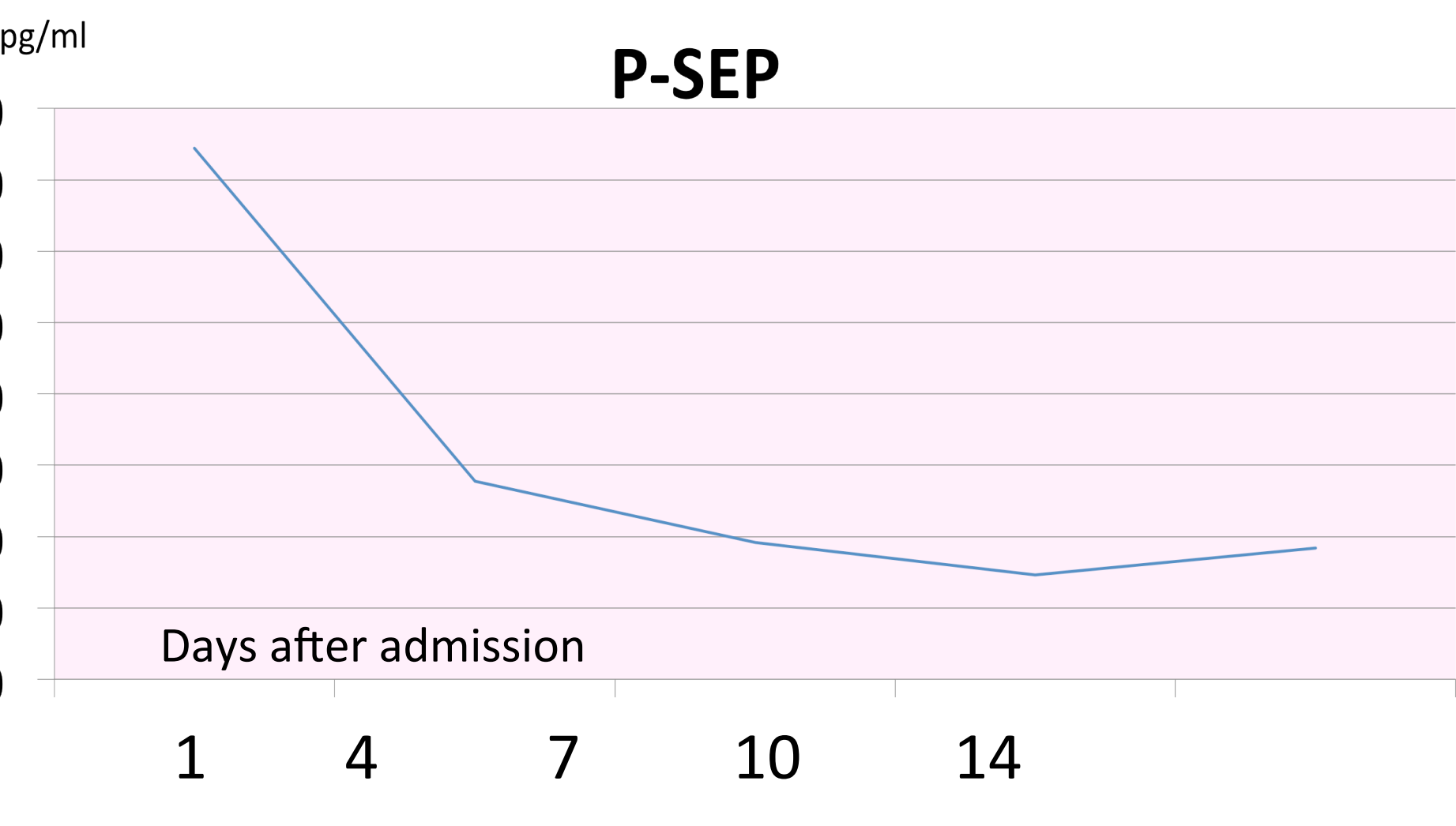
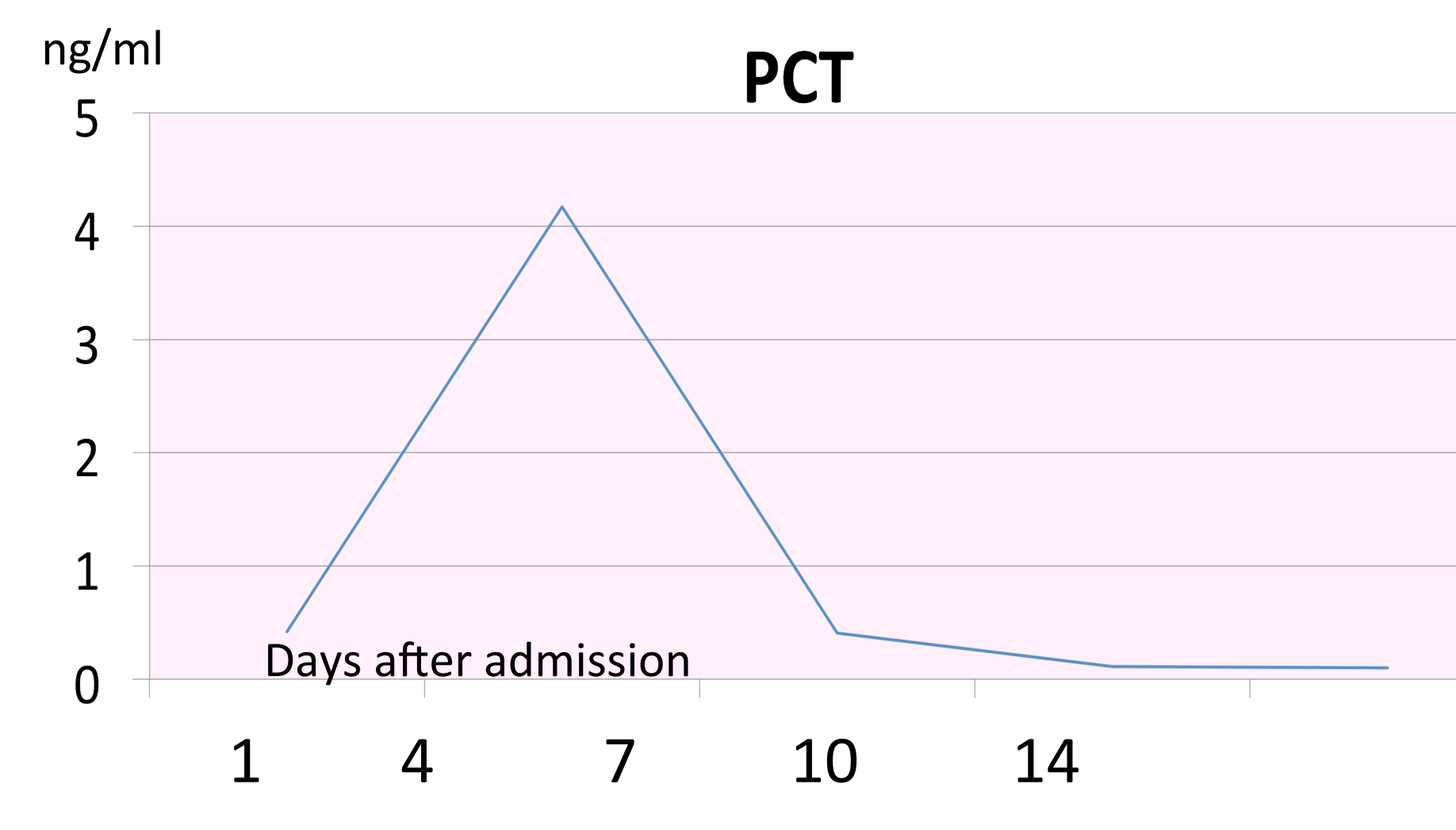
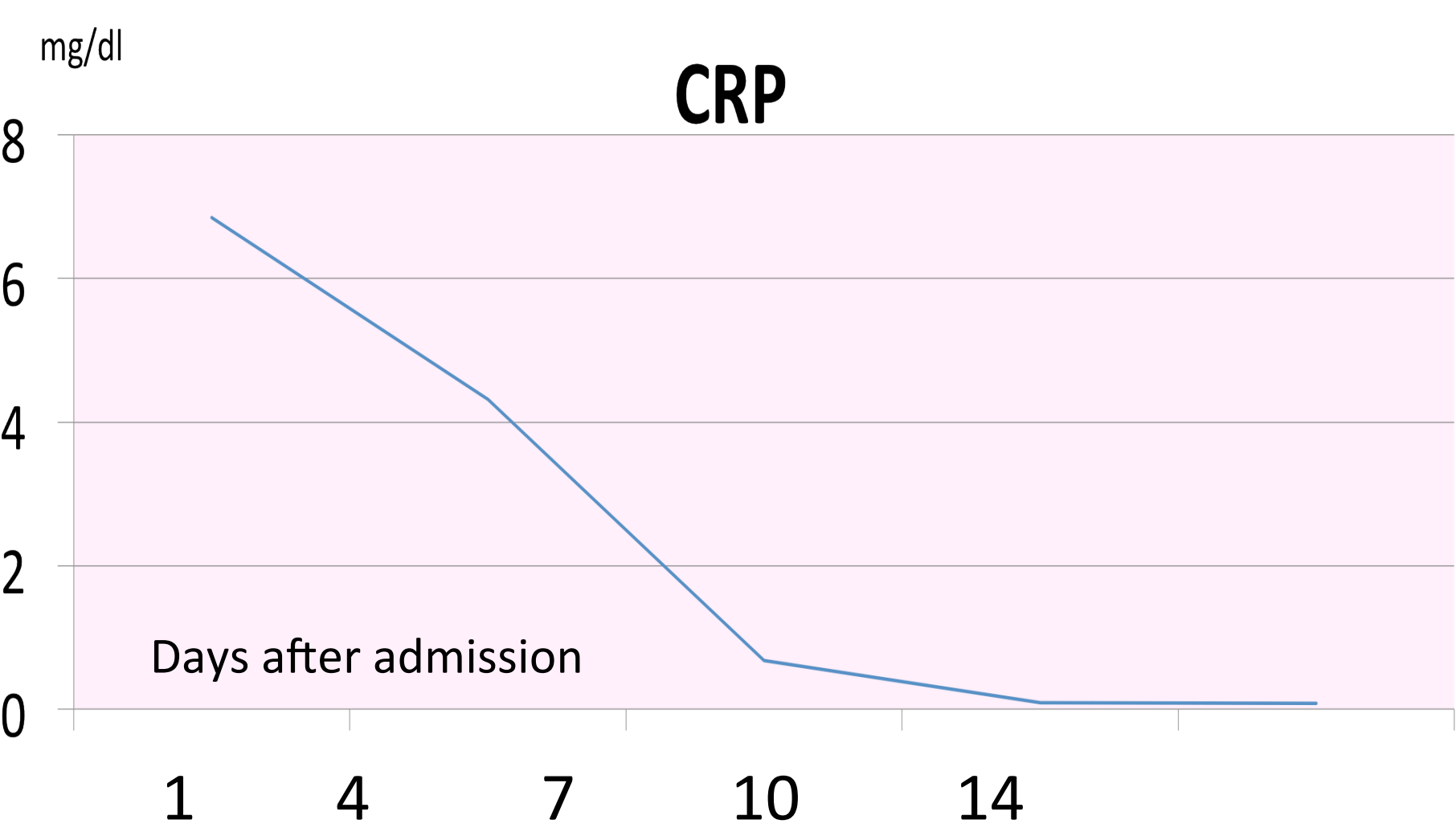
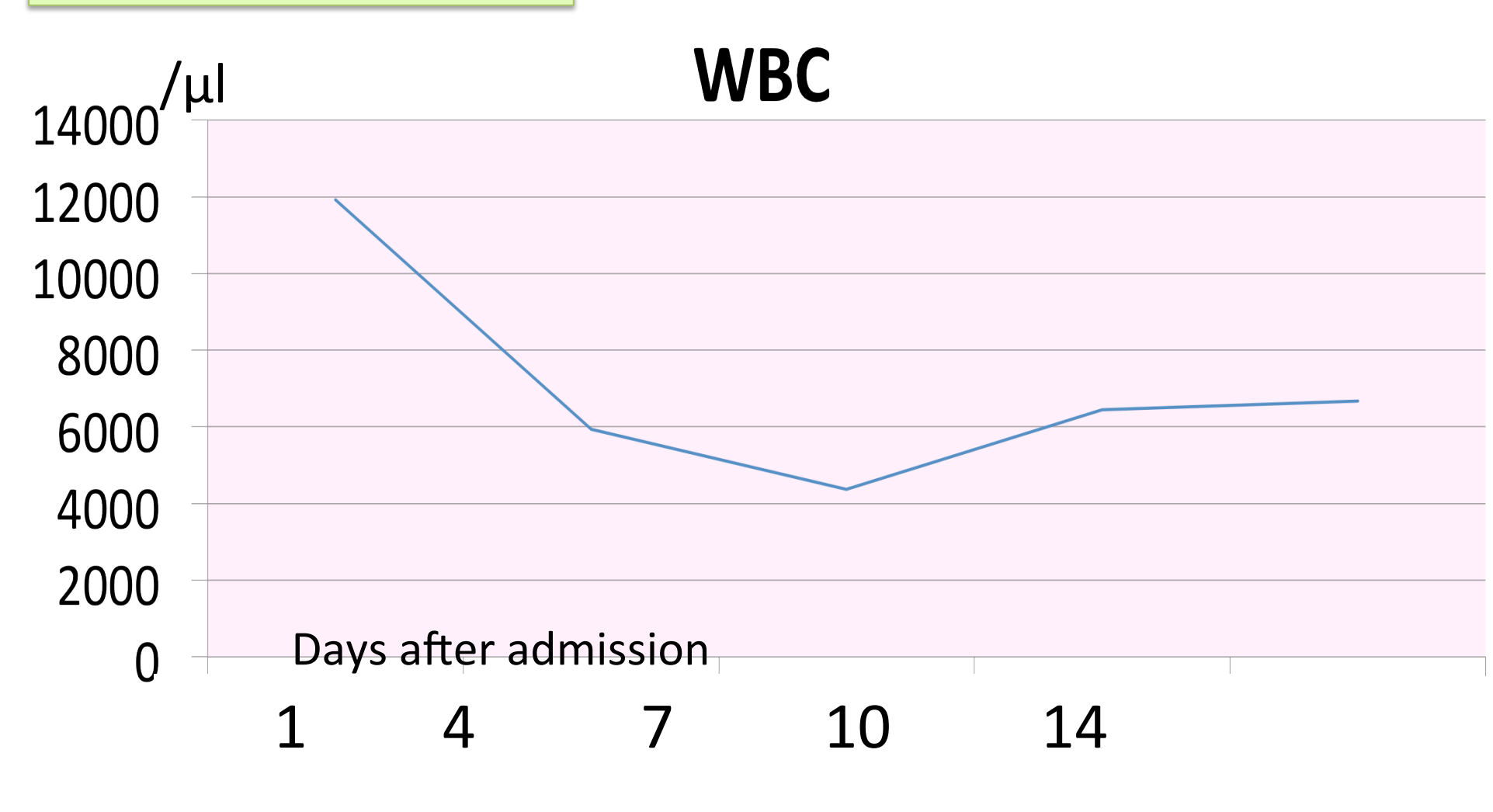
Figs 6a, b, c, d

A case of one year seven months old boy with **bacterial meningitis**. *H.influenzae* was detected with culture from blood and cerebrospinal fluid. He recovered by cefotaxime and meropenem.



Figs 7a, b, c, d

A case of nine months old boy with **urinary tract infection**. *E.coli* was detected with culture from blood and urine. He recovered quickly by cefazolin.



CONCLUSIONS

- Increased plasma concentration of presepsin was observed in pediatric patients with bacteremia.
- Presepsin could be a possible biomarker of sepsis in pediatric patients, however, their reference interval in children could be lower than that of adults.

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