individual patient information. The pharmacokinetic profile of the patient may be refined or modified based on previous therapeutic plasma protein treatments of the patient and/or patient specific characteristics such as age, body weight, other plasma protein levels, physical activity level, gender, disease state, etc. The system, method, and apparatus provide a graphical interface of the pharmacokinetic profile of the patient that enables a user (e.g., a health care professional) to adjust dosage, dosing interval, and a minimum acceptable concentration of the therapeutic plasma protein within the patient to view how the dosing regimen changes. Such a configuration enables a healthcare provider to determine an optimal dosing regimen that reduces (or prevents) a patient from risk of bleeds as a result of having low levels of clotting factor VIII.

[0008a] In an aspect, there is provided a method for providing a clotting factor VIII dosing regimen including: determining a clotting factor VIII clearance for a patient based on two blood samples collected from the patient after an infusion of clotting factor VIII; determining if a patient has a half-life greater than a predetermined threshold; determining, via a processor, an estimated pharmacokinetic profile of a patient using a Bayesian model of pharmacokinetic profiles of sampled patients, the estimated pharmacokinetic profile based upon at least one of a body weight or an age of the patient such that: a first weighting factor is applied to the Bayesian model of pharmacokinetic profiles of sampled patients if the half-life of the patient is greater than the predetermined threshold, and a second weighting factor, less than the first weighting factor, is applied to the Bayesian model of pharmacokinetic profiles of sampled patients if the half-life of the patient is less than the predetermined threshold; and determining, via the processor, a dosing regimen for a specified dosing interval including (i) a dosage and (ii) an estimated clotting factor VIII clearance for the patient over a time period based at least upon the estimated pharmacokinetic profile.

[0008b] In another aspect, there is provided an apparatus for providing a therapeutic plasma protein dosing regimen to a client device, the apparatus including: a model generator configured to create a Bayesian model of pharmacokinetic profiles of sampled patients, the Bayesian model including a (i) therapeutic plasma protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon at least one of patient age or body weight; and a pharmacokinetic server configured to: determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model, a half-life of the therapeutic plasma protein within the patient, and at least one of an age of the patient or a weight of the patient; determine the therapeutic plasma protein dosing regimen including a dosage and a therapeutic plasma protein level over a time period based upon the approximate pharmacokinetic profile of the patient, wherein the approximate pharmacokinetic profile of the patient is weighted based upon the half-life such that, if the half-life is greater than a predetermined threshold, the approximate pharmacokinetic profile of the patient is weighted more heavily than if the half-life is less than the predetermined threshold; modify the therapeutic plasma protein dosing regimen in response to receiving a dosing interval for applying the dosage to the patient to create a modified therapeutic plasma protein dosing regimen; and transmit the modified therapeutic plasma protein dosing regimen to the client device.

[0008c] In another aspect, there is provided a machine-accessible device having instructions stored thereon that are configured, when executed, to cause a machine to at least: prompt a user to enter at least one of a patient weight or age; use a Bayesian model of pharmacokinetic profiles of sampled patients to determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model, a half-life of a therapeutic plasma protein within the patient, and at least one of the patient weight or age, the Bayesian model including (i) a therapeutic plasma protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon the at least one of the patient weight or age; determine a dosing regimen for the patient based upon the approximate pharmacokinetic profile of the patient, the dosing regimen including a dosage and a dosage interval, wherein the approximate pharmacokinetic profile of the patient is weighted based upon the half-life such that, if the half-life is greater than a predetermined threshold, the approximate pharmacokinetic profile of the patient is weighted more heavily than if the half-life is less than the predetermined threshold; modify the dosing regimen in response to receiving another dosing interval for applying the dosage to the patient; and display to a user the dosing regimen and a time-varying therapeutic plasma protein level based on the dosing regimen.

[0008d] In another aspect, there is provided a drug dosing tool, the tool including: interface circuits configured to receive two blood samples collected from a patient after an infusion of clotting factor VIII; one or more processors coupled to memory, the one or more processors configured to: determine a first elimination rate constant of clotting factor VIII for the patient based on the two blood samples; determine a second elimination rate constant using a Bayesian model of pharmacokinetic (PK) profiles of sampled patients each of which are stored in memory, wherein the second elimination rate constant is associated an elimination rate of the clotting factor VIII of a population defined by the sampled patients, the population having a similar age and body weight of the patient; determine a half-life of clotting factor VIII within the patient; determine a relationship between the first elimination rate constant and the second elimination rate constant, wherein the relationship is weighted based upon the half-life such that, if the half-life is greater than a predetermined threshold, the PK profiles of sampled patients are weighted more heavily than if the half-life is less than the predetermined threshold; update the Bayesian model based on the relationship; determine an estimated PK profile of the patient using the updated Bayesian model; and determine a dosing regimen for a specified dosing interval including (i) a dosage and (ii) an estimated clotting factor VIII clearance for the patient over a time period based at least upon the estimated PK profile.

[0009] In an example embodiment, a method includes determining an estimated pharmacokinetic profile of a patient using a Bayesian model of pharmacokinetic profiles of sampled patients, the estimated pharmacokinetic profile based upon at least one of a body weight or an age of the patient. The example method also includes determining a first dosing regimen for a first specified dosing interval including (i) a first dosage and (ii) a first therapeutic plasma protein level in the patient over a time period based at least upon the estimated pharmacokinetic profile and determining a second dosing regimen for a second specified dosing interval including (i) a second dosage and (ii) a second therapeutic plasma protein level in the patient over the time period based at least upon the estimated pharmacokinetic profile. The method further includes displaying the first dosing regimen and the second dosing regimen on a client device such that the first dosing regimen is displayed in conjunction with the second dosing regimen.

[0010] In another example embodiment, an apparatus includes a model generator configured to create a Bayesian model of pharmacokinetic profiles of sampled patients, the Bayesian model including a (i) therapeutic plasma protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon at least one of patient age or body weight. The example apparatus also includes a pharmacokinetic server configured to determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model and at least one of an age of the patient or a body weight of the patient and determine a therapeutic plasma protein dosing regimen including a dosage and a therapeutic plasma protein level over a time period based upon the approximate pharmacokinetic profile of the patient. The pharmacokinetic server is also configured to modify the therapeutic plasma protein dosing regimen in response to receiving a dosing interval for applying the dosage to the patient and transmit the modified therapeutic plasma protein dosing regimen to a client device.

[0011] In yet another example embodiment, a machine-accessible device has instructions stored thereon that are configured, when executed, to cause a machine to at least prompt a user to enter at least one of a patient body weight or age and use a Bayesian model of pharmacokinetic profiles of sampled patients to determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model and the at least one of entered patient body weight or age, the Bayesian model including (i) a therapeutic plasma protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon the at least one of entered patient body weight or age. The example instructions also cause the machine to determine a dosing regimen for the patient based upon the approximate pharmacokinetic profile of the patient, the dosing regimen including a dosage and a dosage interval. The example instructions further cause the machine to modify the dosing regimen in response to receiving another dosing interval for applying the dosage to the patient and enable the dosing regimen and a time-varying therapeutic plasma protein level based on the dosing regimen to be displayed to a user.

[0012] Aspects of the subject matter described herein may be useful alone or in combination with one or more other aspect described herein. Without limiting the foregoing description, in a first aspect of the present disclosure, a method for providing a therapeutic plasma protein dosing regimen includes determining, via a processor, an estimated pharmacokinetic profile of a patient using a Bayesian model of pharmacokinetic profiles of sampled patients, the estimated pharmacokinetic profile based upon at least one of a body weight or an age of the patient, determining, via the processor, a first dosing regimen for a first specified dosing interval including (i) a first dosage and (ii) a first therapeutic plasma protein level in the patient over a time period based at least upon the pharmacokinetic profile, determining, via the processor, a second dosing regimen for a second specified dosing interval including (i) a second dosage and (ii) a second therapeutic plasma protein level in the patient over the time period based at least upon the pharmacokinetic profile, and displaying the first dosing regimen and the second dosing regimen on a client device such that the first dosing regimen is displayed in conjunction with the second dosing regimen.

[0013] In accordance with an embodiment of the present disclosure, which may be used in combination with the first aspect, the method further includes adjusting, via the processor, the estimated pharmacokinetic profile of the patient based upon previous treatments of the patient.

[0014] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the second specified dosing interval is longer than the first specified dosing interval.

[0015] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the first specified dosing interval is 48 hours and the second specified dosing interval is 72 hours.

[0016] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the minimum threshold level is less than 20%.

[0017] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the first dosage is determined such that the first therapeutic plasma protein level in the patient over the time period does not fall below the minimum threshold level.

[0018] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the first therapeutic plasma protein level in the patient is based upon at least one of a minimum threshold level, the first dosage, or the first specified dosing interval, and the second therapeutic plasma protein level in the patient is based upon at least one of the minimum threshold level, the second dosage, or the second specified dosing interval.

[0019] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the Bayesian model of pharmacokinetic profiles of sampled patients includes a two-compartment model having a first compartment corresponding to a time to metabolize the therapeutic plasma protein and a second compartment corresponding to a dose for achieving a certain amount of the therapeutic plasma protein within the patient. In some embodiments, the Bayesian model may mathematically describe a pharmacokinetic disposition of clotting factor FVIII once administered to a patient.

[0020] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, an apparatus for providing a therapeutic plasma protein dosing regimen to a client device includes a model generator configured to create a Bayesian model of pharmacokinetic profiles of sampled patients, the Bayesian model including a (i) therapeutic plasma protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon at least one of patient age or body weight and a pharmacokinetic server configured to determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model and at least one of an age of the patient or a body weight of the patient, determine the therapeutic plasma protein dosing regimen including a dosage and a therapeutic plasma protein level over a time period based upon the approximate pharmacokinetic profile of the patient, modify the therapeutic plasma protein dosing regimen in response to receiving a dosing interval for applying the dosage to the patient, and transmit the modified therapeutic plasma protein dosing regimen to the client device.

[0021] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the dosing interval is

a two-day dosing interval, and wherein the pharmacokinetic server is configured to further modify the therapeutic plasma protein dosing regimen in response to receiving a three-day dosing interval in place of the two-day dosing interval.

[0022] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the pharmacokinetic server is configured to transmit a drug dosing tool to the client device, the drug dosing tool being configured to determine the therapeutic plasma protein dosing regimen and the modified therapeutic plasma protein dosing regimen.

[0023] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the pharmacokinetic server is further configured to modify the therapeutic plasma protein dosing regimen based on daily activities of the patient.

[0024] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the pharmacokinetic server is further configured to transmit the modified therapeutic plasma protein dosing regimen to an infusion pump for administering the therapeutic plasma protein to the patient. In this aspect and any other aspect, a physician, via the pharmacokinetic server, can locally or remotely control the infusion pump such that the patient is only dosed (i.e., administered) with an amount of the therapeutic plasma protein that is consistent with a current dosing regimen based on the pharmacokinetic profile of the patient. Additionally, the physician, via the drug dosing tool, can remotely monitor and provide the patient with a renewed prescription of the therapeutic plasma protein based on a currently an available quantity of the therapeutic.

[0025] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the approximate pharmacokinetic profile is a first approximate pharmacokinetic profile determined for a first therapeutic plasma protein treatment of the patient, and wherein the pharmacokinetic server is further configured to determine a second approximate pharmacokinetic profile for the patient for a second therapeutic plasma protein treatment of the patient based on the modified therapeutic plasma protein dosing regimen.

[0026] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the volume of distribution relationship for the therapeutic plasma protein is a relationship for at least one of clotting factor VIII and modified forms of clotting factor VIII.

[0027] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, a machine-accessible device has instructions stored thereon that are configured, when executed, to cause a machine to at least prompt a user to enter at least one of a patient body weight or age, use a Bayesian model of pharmacokinetic profiles of sampled patients to determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model and the at least one of entered patient body weight or age, the Bayesian model including (i) a therapeutic plasma

protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon the at least one of entered patient body weight or age, determine a dosing regimen for the patient based upon the approximate pharmacokinetic profile of the patient, the dosing regimen including a dosage and a dosage interval, modify the dosing regimen in response to receiving another dosing interval for applying the dosage to the patient, and enable the dosing regimen and a time-varying therapeutic plasma protein level based on the dosing regimen to be displayed to a user.

[0028] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the machine-accessible device further comprises instructions stored thereon that are configured when executed to cause the machine to determine a first dosing regimen for a two-day dosing interval, determine a second dosing regimen for a three-day dosing interval, and display the first dosing regimen in conjunction with the second dosing regimen.

[0029] In accordance with an embodiment aspect of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the machine-accessible device further comprises instructions stored thereon that are configured when executed to cause the machine to display a graphical representation of a time-varying amount of the therapeutic plasma protein within the patient, including at least one indication of a dose of the therapeutic plasma protein being provided to the patient.

[0030] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the machine-accessible device further comprises instructions stored thereon that are configured when executed to cause the machine to display a graphical feature than enables a user to change at least one of (i) a minimum concentration threshold, (ii) the dosage interval, or (iii) the dosage of the therapeutic plasma protein.

[0031] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the machine-accessible device further comprises instructions stored thereon that are configured when executed to cause the machine to modify the dosing regimen in response to receiving a change of any one of the items (i), (ii), or (iii).

[0032] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the machine-accessible device further comprises instructions stored thereon that are configured when executed to cause the machine to display a graphical representation of a change in an amount of the therapeutic plasma protein within the patient over time based on the change of any one of the items (i), (ii), or (iii).

[0033] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the machine-accessible device further comprises instructions stored thereon that are configured when executed to cause the machine to receive a minimum concentration threshold and to display an amount of time the time-varying therapeutic plasma protein level is below the minimum concentration threshold.

[0034] In accordance with an embodiment of the present disclosure, which may be used in combination with any one or more of the preceding aspects, the machine-accessible device further comprises instructions stored thereon that are configured when executed to cause the machine to receive patient measurement blood laboratory data including a concentration of the therapeutic plasma protein within the patient after a time from when the therapeutic plasma protein was administered to the patient and modify the approximate pharmacokinetic profile based on the patient measurement blood laboratory data.

[0035] In accordance with embodiments of the present disclosure, any of the structure and functionality illustrated and described in connection with FIGS. 1 to 31 may be used in combination with any of the structure and functionality illustrated and described in connection with any of the other of FIGS. 1 to 31 and with any one or more of the preceding aspects.

BRIEF DESCRIPTION OF THE FIGURES

[0036] FIG. 1 shows a diagram of an example pharmacokinetic drug dosing environment, according to an example embodiment of the present disclosure.

[0037] FIG. 2 shows a diagram of patient sample data for a number of patients with hemophilia A, according to an example embodiment of the present disclosure.

[0038] FIGS. 3 to 13 show diagram that include example user interfaces provided by the drug dosing tool of FIG. 1 to determine a dosing recommendation and estimated pharmacokinetic profile for a specific patient, according to an example embodiment of the present disclosure.

[0039] FIGS. 14 to 18 show diagrams that include user interfaces provided by the drug dosing tool of FIG. 1 in a marketing tool embodiment, according to an example embodiment of the present disclosure.

[0040] FIGS. 19 and 20 show diagrams that include a flow diagram illustrating an example procedure to determine a dosing regimen, according to an example embodiment of the present disclosure.

[0041] FIGS. 21 and 22 show diagrams that include an example embodiment where a pharmacokinetic profile for a specific patient is adjusted based on activity level.

CLAIMS

1. A method for providing a clotting factor VIII dosing regimen comprising:

determining a clotting factor VIII clearance for a patient based on two blood samples collected from the patient after an infusion of clotting factor VIII;

determining if a patient has a half-life greater than a predetermined threshold;

determining, via a processor, an estimated pharmacokinetic profile of a patient using a Bayesian model of pharmacokinetic profiles of sampled patients, the estimated pharmacokinetic profile based upon at least one of a body weight or an age of the patient such that:

a first weighting factor is applied to the Bayesian model of pharmacokinetic profiles of sampled patients if the half-life of the patient is greater than the predetermined threshold, and

a second weighting factor, less than the first weighting factor, is applied to the Bayesian model of pharmacokinetic profiles of sampled patients if the half-life of the patient is less than the predetermined threshold; and

determining, via the processor, a dosing regimen for a specified dosing interval including (i) a dosage and (ii) an estimated clotting factor VIII clearance for the patient over a time period based at least upon the estimated pharmacokinetic profile.

2. The method of Claim 1, further comprising adjusting, via the processor, the estimated pharmacokinetic profile of the patient based upon previous treatments of the patient.

3. The method of Claim 1, wherein the specified dosing interval is 48 hours or 72 hours.

4. The method of Claim 1, wherein the dosage is determined such that the estimated clotting factor VIII clearance in the patient over the time period does not fall below a minimum threshold level.

5. The method of Claim 4, wherein the minimum threshold level is less than 20%.

6. The method of Claim 1, wherein the estimated clotting factor VIII clearance in the patient is based upon at least one of a minimum threshold level, the dosage, or the specified dosing interval.

7. The method of Claim 1, wherein the Bayesian model of pharmacokinetic profiles of sampled patients includes a two-compartment model having a first compartment corresponding to a time to metabolize the clotting factor VIII and a second compartment corresponding to a dose for achieving a certain amount of the clotting factor VIII within the patient.

8. An apparatus for providing a therapeutic plasma protein dosing regimen to a client device, the apparatus comprising:

a model generator configured to create a Bayesian model of pharmacokinetic profiles of sampled patients, the Bayesian model including a (i) therapeutic plasma protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon at least one of patient age or body weight; and

a pharmacokinetic server configured to:

determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model, a half-life of the therapeutic plasma protein within the patient, and at least one of an age of the patient or a weight of the patient;

determine the therapeutic plasma protein dosing regimen including a dosage and a therapeutic plasma protein level over a time period based upon the approximate pharmacokinetic profile of the patient, wherein the approximate pharmacokinetic profile of the patient is weighted based upon the half-life such that, if the half-life is greater than a predetermined threshold, the approximate pharmacokinetic profile of the patient is weighted more heavily than if the half-life is less than the predetermined threshold;

modify the therapeutic plasma protein dosing regimen in response to receiving a dosing interval for applying the dosage to the patient to create a modified therapeutic plasma protein dosing regimen; and

transmit the modified therapeutic plasma protein dosing regimen to the client device.

9. The apparatus of Claim 8, wherein the dosing interval is a two-day dosing interval, and wherein the pharmacokinetic server is configured to further modify the therapeutic plasma protein dosing regimen in response to receiving a three-day dosing interval in place of the two-day dosing interval.

10. The apparatus of Claim 8, wherein the pharmacokinetic server is configured to transmit a drug dosing tool to the client device, the drug dosing tool being configured to determine the therapeutic plasma protein dosing regimen and the modified therapeutic plasma protein dosing regimen.

11. The apparatus of Claim 8, wherein the pharmacokinetic server is further configured to modify the therapeutic plasma protein dosing regimen based on daily activities of the patient.

12. The apparatus of Claim 8, wherein the pharmacokinetic server is further configured to transmit the modified therapeutic plasma protein dosing regimen to an infusion pump for administering the therapeutic plasma protein to the patient.

13. The apparatus of Claim 8, wherein the approximate pharmacokinetic profile is a first approximate pharmacokinetic profile determined for a first therapeutic plasma protein treatment of the patient, and wherein the pharmacokinetic server is further configured to determine a second approximate pharmacokinetic profile for the patient for a second therapeutic plasma protein treatment of the patient based on the modified therapeutic plasma protein dosing regimen.

14. The apparatus of Claim 8, wherein the volume of distribution relationship for the therapeutic plasma protein is a relationship for at least one of clotting factor VIII and modified forms of clotting factor VIII.

15. A machine-accessible device having instructions stored thereon that are configured, when executed, to cause a machine to at least:

prompt a user to enter at least one of a patient weight or age;

use a Bayesian model of pharmacokinetic profiles of sampled patients to determine an approximate pharmacokinetic profile of a patient based upon the Bayesian model, a half-life of a therapeutic plasma protein within the patient, and at least one of the patient weight or age, the Bayesian model including (i) a therapeutic plasma protein clearance and (ii) a volume of distribution relationship for a therapeutic plasma protein based upon the at least one of the patient weight or age;

determine a dosing regimen for the patient based upon the approximate pharmacokinetic profile of the patient, the dosing regimen including a dosage and a dosage interval, wherein the approximate pharmacokinetic profile of the patient is weighted based upon the half-life such that, if the half-life is greater than a predetermined threshold, the approximate pharmacokinetic profile of the patient is weighted more heavily than if the half-life is less than the predetermined threshold;

modify the dosing regimen in response to receiving another dosing interval for applying the dosage to the patient; and

display to a user the dosing regimen and a time-varying therapeutic plasma protein level based on the dosing regimen.

16. The machine-accessible device of Claim 15, further comprising instructions stored thereon that are configured when executed to cause the machine to:

determine a first dosing regimen for a two-day dosing interval;

determine a second dosing regimen for a three-day dosing interval; and

display the first dosing regimen in conjunction with the second dosing regimen.

17. The machine-accessible device of Claim 15, further comprising instructions stored thereon that are configured when executed to cause the machine to display a graphical representation of a time-varying amount of the therapeutic plasma protein within the patient, including at least one indication of a dose of the therapeutic plasma protein being provided to the patient.

18. The machine-accessible device of Claim 15, further comprising instructions stored thereon that are configured when executed to cause the machine to display a graphical feature than enables a user to change at least one of:

(i) a minimum concentration threshold;

(ii) the dosage interval; or

(iii) the dosage of the therapeutic plasma protein.

19. The machine-accessible device of Claim 18, further comprising instructions stored thereon that are configured when executed to cause the machine to modify the dosing regimen in response to receiving a change of any one of the items (i), (ii), or (iii).

20. The machine-accessible device of Claim 19, further comprising instructions stored thereon that are configured when executed to cause the machine to display a graphical representation of a change in an amount of the therapeutic plasma protein within the patient over time based on the change of any one of the items (i), (ii), or (iii).

21. The machine-accessible device of Claim 19, further comprising instructions stored thereon that are configured when executed to cause the machine to receive a minimum concentration threshold and to display an amount of time the time-varying therapeutic plasma protein level is below the minimum concentration threshold.

22. The machine-accessible device of Claim 15, further comprising instructions stored thereon that are configured when executed to cause the machine to:

receive patient measurement blood data laboratory including a concentration of the therapeutic plasma protein within the patient after a time from when the therapeutic plasma protein was administered to the patient; and

modify the approximate pharmacokinetic profile based on the patient measurement blood laboratory data.

23. A drug dosing tool, the tool comprising:

interface circuits configured to receive two blood samples collected from a patient after an infusion of clotting factor VIII;

one or more processors coupled to memory, the one or more processors configured to:

determine a first elimination rate constant of clotting factor VIII for the patient based on the two blood samples;

determine a second elimination rate constant using a Bayesian model of pharmacokinetic (PK) profiles of sampled patients each of which are stored in memory, wherein the second elimination rate constant is associated an elimination rate of the clotting factor VIII of a population defined by the sampled patients, the population having a similar age and body weight of the patient;

determine a half-life of clotting factor VIII within the patient;

determine a relationship between the first elimination rate constant and the second elimination rate constant, wherein the relationship is weighted based upon the half-life such that, if the half-life is greater than a predetermined threshold, the PK profiles of sampled patients are weighted more heavily than if the half-life is less than the predetermined threshold;

update the Bayesian model based on the relationship;

determine an estimated PK profile of the patient using the updated Bayesian model; and

determine a dosing regimen for a specified dosing interval including (i) a dosage and (ii) an estimated clotting factor VIII clearance for the patient over a time period based at least upon the estimated PK profile.