CLAIMS:

1. An $^{82}Sr/^{82}Rb$ elution system (14), comprising:

a $^{82}Sr/^{82}Rb$ generator (8);

a processor; and

a memory communicatively coupled to the processor when the system is operational, the memory bearing processor-executable instructions that, when executed on the processor, cause the system to at least:

begin to assess a concentration of ^{82}Rb, ^{82}Sr, or ^{85}Sr in a fluid that is eluted from the generator, the volume of the fluid that is eluted from the generator, or the pressure of the fluid flowing through at least one portion of the system;

when the assessment is completed,

generate an output on a user interface (44) that recommends a course of action or no course of action, based on a result of the assessment, or

store an indication of the result of the assessment in a memory location, and upload the indication of the result of the assessment to a computer via a communications network;

when the assessment is interrupted, halting the generator to prevent user circumvention of quality control; and

wherein the memory further bears instructions that, when executed on the processor, cause the system to at least:

in response to determining that a total volume of the fluid eluted from the generator exceeds a limit threshold, preventing elution until the generator is replaced with a new generator.

2. The system of claim 1, further comprising:

a pump (6); and

a controller (28) communicatively coupled with the pump and the processor, the controller shutting down the pump in response to determining that communication with the processor has been lost.

3. The system of claim 1, wherein the memory further bears instructions that, when executed on the processor, cause the system to at least:

in response to determining that a ratio of the concentration of ^{82}Sr to ^{82}Rb, or ^{85}Sr to ^{82}Rb is greater than a maximum threshold of USP, preventing elution until the generator is replaced with a new generator.

4. The system of claim 1, wherein the memory further bears instructions that, when executed on the processor, cause the system to at least:

in response to determining that a ratio of the concentration of ^{82}Sr to ^{82}Rb, or ^{85}Sr to ^{82}Rb is greater than a warning threshold of USP, performing an additional assessment after a delimited number of patients are treated with the system since determining that the ratio of ^{82}Sr to ^{82}Rb, or ^{85}Sr to ^{82}Rb is greater than a warning threshold of USP.

5. The system of claim 1, further comprising:

a pump; and

where in the memory further bears processor-executable instructions that, when executed on the processor, cause the system to at least:

in response to determining that the in-line pressure of the fluid is outside an acceptable range, stopping the pump.

6. The system of claim 1, further comprising:

a pump, a positron detector (20), and a generator valve (16) or a patient valve (24); and

wherein the memory further bears processor-executable instructions that, when executed on the processor, cause the system to stop the pump in response to identifying a malfunction of the pump, the pressure sensor, the valve, or the positron detector.

7. The system of claim 1, wherein the memory further bears instructions that, when executed on the processor, cause the system to at least:

in response to determining that a half-life of an isotope in the fluid eluted is not indicative of ^{82}Rb, perform an assessment where the elution is not provided to a patient before performing an assessment where an elution is provided to the patient.

8. The system of claim 1, wherein the assessment comprises:

determining a ratio of the concentration of ^{82}Sr to ^{82}Rb and a ratio of the

concentration of ^{85}Sr to ^{82}Rb in the fluid.

9. The system of claim 1, further comprising:

a portable cart (68) that houses the generator, the processor, a pump, the memory, a patient line, a bypass line, a positron detector, and a dose calibrator.

10. The system of claim 9, wherein the cart comprises an interior that is coated with a vibration-absorbing material.

11. The system of claim 1, wherein the memory further bears instructions that, when executed on the processor on a given day, cause the system to at least:

in response to determining that the assessment has not been performed within a predetermined period of time preceding the execution of said instructions, perform the assessment check before performing an additional patient elution.

12. The system of claim 11, wherein the memory further bears instructions that, when executed on the processor, cause the system to at least:

in response to determining from the assessment performed on the given day that the ^{82}Sr or ^{85}Sr concentration is above a threshold, perform a flush elution and a calibration elution before performing a patient elution.

13. The system of claim 1, configured such that the instructions that, when executed upon the processor, cause the system to at least upload the indication of the result of the assessment to a computer via a communications network further cause the system to at least:

be configured to upload the indication of the result of the assessment to a computer via a communications network, the computer configured to combine the result of the assessment with a result of an assessment of another $^{82}Sr/^{82}Rb$ elution system.