What is Claimed:

1. An $^{82}Sr/^{82}Rb$ elution system for delivering an elution of ^{82}Rb to a patient, comprising:

a $^{82}Sr/^{82}Rb$ generator;

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:

accept patient weight as an input function; and,

based on at least the entered patient weight, determine an optimal quantity of ^{82}Rb to deliver to the patient in order to permit production of a diagnostically adequate imaging scan,

wherein the scan is performed using a positron emission tomography (PET) imaging system,

and wherein the memory further bears instructions that, when executed on the processor, cause the system to accept the imaging equipment and acquisition type of the PET imaging system as an input function in order to determine the optimal quantity of ^{82}Rb to deliver to the patient in order to permit production of the diagnostically adequate imaging scan.

2. The system of claim 1, said system further comprising:

a reservoir for housing a sterile saline solution;

a generator bypass line; and,

the memory bearing processor-executable instructions that, when executed on the processor, further cause the system to:

following a patient elution, deliver a saline flush from the reservoir via the bypass line to a location in said system downstream of the generator in order to flush residual ^{82}Rb from the system downstream of the generator and deliver the flushed residual ^{82}Rb to the patient.

3. The system according to claim 2, wherein the bypass line delivers the saline flush to a feed line that extends between the generator and a positron detector.

4. The system according to claim 2 or claim 3, wherein the memory bears processor-executable instructions that, when executed on the processor, cause the system, following a patient elution, to measure an amount of residual radioactivity in the system downstream of the generator,

and,

based at least in part on the measured amount of residual radioactivity, determine a volume of the saline flush for flushing at least some of the residual radioactivity from the system downstream of the generator.

5. The system of claim 1, said system wherein, comprising:

the memory bearing processor-executable instructions that, when executed on the processor, cause the system to:

determine an optimal period of time from the commencement of a patient elution to the commencement of an imaging protocol with respect to said patient, wherein the determination is further based on

a total activity dosage to be delivered to the patient during the patient elution;

patient weight;

generator performance as determined during a daily quality control test;

total system performance as determined during a daily quality control test;

elution mode;

flow rate;

or, any combination thereof.

6. The system according to claim 5, wherein the system is further configured to generate an output on a user interface of the determined optimal period of time until commencement of the imaging protocol.

7. The system of claim 1, said system wherein the memory bearing processor-executable instructions, when executed on the processor, further cause the system to:

measure the total volume of saline that flows through the generator during the total period

of use of that generator, and use the measured volume to assess a remaining lifetime of the generator.

8. The system according to claim 7, wherein the memory bears processor-executable instructions that, when executed on the processor, cause the system to prevent elution until the generator is replaced with a new generator when the assessed remaining lifetime of the generator is inadequate to meet a preset standard.

9. The system according to claim 8, wherein the preset standard is a volume of eluant required for a new patient elution.

10. The system according to claim 8, wherein the preset standard is an amount radioactivity required for a new patient elution.

11. The system of claim 2, wherein, the memory bearing processor-executable instructions, when executed on the processor, further cause the system to

measure the total volume of saline that flows through the generator and through the bypass line during the total period of use of the saline reservoir in order to assess a remaining volume of saline in the saline reservoir.

12. The system according to claim 11, wherein the memory bears processor-executable instructions that, when executed on the processor, cause the system to

prevent elution until the saline reservoir is refilled with saline or replaced with a new saline reservoir when the assessed remaining volume of saline in the saline reservoir is less than a preset volume.

13. The system of claim 1, said system further comprising:

a saline reservoir for housing a sterile saline solution;a waste reservoir configured for receiving a volume of saline that is eluted from the generator;

and wherein,

the memory bearing processor-executable instructions that, when executed on the processor, further cause the system to:

measure the total volume of saline received by the waste reservoir during the total period of use of that waste reservoir, and use the measured volume to assess the volume of saline in the waste reservoir relative to the total volume capacity of the waste reservoir.

14. The system according to claim 13, wherein the memory bears processor-executable instructions that, when executed on the processor, cause the system to prevent elution until the waste reservoir is emptied when the assessed volume of saline in the waste reservoir is greater than a safe volume for preventing overflow of the waste reservoir.