Purpose:
To develop a protocol for CBCT imaging frequency that considers both the need for setup accuracy and the potentially unnecessary risks of using CBCT too often.

Methods:
An Elekta Infinity XVI CBCT system is used in conjunction with the MOSAIQ record and verify system to acquire and record the daily localization of patients in our department. Each patient is planned with specific margins around target structures to take inter- and intra-fraction motion into account. During the planning stage, the CTV to PTV expansion margin is noted for each patient and approved by the radiation oncologist. If CBCT is ordered to align the patient, we start by imaging the patient daily. Shifts are recorded automatically in the record and verify system and analyzed after the first five or ten fractions. The standard deviation of these shifts is compared with the margins created during the planning process and the imaging frequency is then determined. Specifically, if the PTV expansion margin is more than twice the standard deviation of the CBCT shifts, the imaging frequency is reduced. In addition, the average shifts of the first five or ten fractions are applied to subsequent imaging and non-imaging days.

Results:
This protocol has been implemented successfully in our clinic and adequately addresses the need to make patient-specific determinations of CBCT imaging frequency and eliminates the need for ongoing subjective analysis by the physicians, physicists, and treatment therapists. The ability of the record and verify system to automatically catalog the shifts as well as pre- determined image frequency criteria works well.

Conclusions:
Using a straightforward statistical analysis of CBCT shifts and planning margins is a good way to manage CBCT imaging frequency.