Effects of Telemedicine Triage on Efficiency and Cost-Effectiveness in Spinal Care
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As medicine becomes increasingly complex, yet increasingly cost-conscious and patient-focused, there is a critical need to facilitate appropriate and timely referrals, particularly in rural areas with limited access to specialty care. Inappropriately directed or excessive referrals can lead to prolonged specialist wait-times, excess patient-redirections and unproductive visits, ultimately resulting in decreased patient satisfaction and reduced physician productivity. In regions with a paucity of specialists and isolated populations, unproductive visits and inappropriate referrals not only strain the patient, but also stress an overburdened healthcare system.

Our group has previously reported our initial experience with telemedicine/electronic (e-) triage.1 Within two years of implementation, the average wait-time for new patients to be seen by a West Virginia University (WVU) spine surgeon improved from between 2.5 and 8 months to between 0.5 and 12 weeks. Treatment initiation and feedback to the patient/referring provider, which conventionally does not occur until the initial clinic appointment, occurred within 24-48 hours of the surgeon review.1 Between 2005-2015, 38,613 patients initiated, and 29,965 patients completed, the WVU Spine Center Referral Intake process. In 2014 alone, 4,387 new patient referrals were encountered, of which 3,636 patients completed the intake process to proceed to surgeon review. There has not yet been a quantification of cost savings or an assessment of improved clinical efficiency. By utilizing our experience with over 29,000 e-triaged spine patients who completed the referral process, we will extrapolate quantitative and qualitative measures of cost savings and efficiency resulting from telemedicine triage of new spine referrals.

**Hypotheses:**

1. E-triage results in cost savings by a) minimizing unnecessary patient travel/clinic visits and time off work by diverting non-spinal pathology to the appropriate providers, b) diverting non-operative patients to non-operative spine physicians, and c) obtaining conservative treatments and additional studies/imaging closer to home.

2. E-triage expedites treatment initiation and additional workup by way of expedited recommendations from a trained spine surgeon who performs remote review of cases and available imaging.

3. A high proportion of NEW clinic patients who underwent e-triage will have completed imaging workup and/or have undergone conservative treatment prior to the visit.

4. A high proportion of NEW clinic patients who underwent e-triage will be operative patients (as indicated by surgical charges after the clinic visit).

5. Of the patients e-triaged to non-operative specialists, a high proportion who are re-referred “ready for surgery” to the surgeon undergo spine surgery.
Method of Research:
On cases initiated between 2008 and 2014, we will review all existing data from the time of initial referral and telemedicine triage, through the treatment process, and up to/including surgery (if ultimately performed). Outpatient e-triage data (Cordata [formerly Priority Consult]; Cordata Healthcare Innovations, LLC, Cincinnati, OH) will be linked with our institution’s electronic medical record (EMR) system (EPIC; EPIC Systems Corporation, Verona, WI) to gather information on downstream treatments (surgeries, procedures) and associated billing. This information will provide insight into the global treatment pathway of the e-triaged patient and the selected time frame will allow assessment of at least two years of post