# 3118 — Guideline Implementation with Clinical Decision Support: Factors Associated with Intensification of Antihypertensive Therapy

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**Objectives:**
We used hypertension as a model to study guideline implementation in primary care practice through a clinical decision support (CDS) system: ATHENA-HTN (hypertension). One objective was to evaluate the impact on primary care provider (PCP) prescribing in a clinical trial.

**Methods:**
ATHENA-HTN presents patient-specific evidence-based recommendations for HTN management to primary care providers (PCPs) in an advisory window within CPRS. For patients whose blood pressure (BP) is only slightly above target (within 5mmHg), ATHENA-HTN recommends intensifying therapy if the BP remains high on repeated measurements. At 4 VAMCs, including 20 substations (10 per study arm), with 76 PCPs (30 control arm, 46 intervention), of whom 38 each were MDs and nonMDs, we randomized by substation, stratified on station (medical center), PCPs' average years at VA, and presence/absence of a pharmacist in the primary-care-clinics. We analyzed patient data extracted from the electronic health record (VistA). For patients with a BP above target at a visit with PCP (index visit), we identified which of the following events occurred FIRST during the year after the index visit: intensification of therapy (Event1), return of patient's BP to below target (Event2), patient seen in clinic and BP either remained above target or was not measured (Event3, undesired event), or patient had neither a return primary care clinic visit nor a repeat BP (Event4, right-censoring). We compared mean proportions of events per PCP between study arms using mixed model regression adjusting for medical center, clinic type (CBOC or not), PCP MD vs non-MD, presence of pharmacist, and mean age of PCP's panel of patients as fixed effects, and substation as a random effect to account for clustering of PCPs. We fit an initial model including all 4 events and did not detect a difference between study arms for mean proportion of event 4; findings are based on denominator of event types 1-3.

**Results:**
17,436 patient met study eligibility, of whom 5334 (30.6%) had an index visit with BP above target. For these 5334 patients, mean proportions of each event per PCP by study arm were Event1 25.4% control vs 30.6% intervention ($p > 0.1$); Event2 59.6% vs 55.2.0% ($p > 0.1$); Event3 16.2% vs 13.7% ($p > 0.1$). A difference in mean proportions of Event1 between study arms was possibly suggested for the MD subgroup only (25.6% control vs 35.5% intervention, $F = 4.14$, $p = 0.072$). The mean proportion of Event1 declined in those panels that averaged over 70 years in age ($p = 0.015$). No significant association was detected between the remaining covariates and any of the outcomes ($p > 0.6$). For 2538/5334 patients (47.6%) with SBP >5mmHg over target, mean proportions of each event per PCP by study arm for Event1 were 33.6% control vs 41.0% intervention ($p > 0.1$), with a difference in mean proportions of Event1 between study arms for the MD subgroup only (33.1% control vs 46.2% intervention, $F = 5.46$, $p = 0.048$).

**Implications:**
BP control overall was good, with almost 70% of patient having BP control at all clinic visits during the study period. Furthermore, among patients who did have a BP above target, more than half were only slightly above target, and almost 60% returned to a controlled BP without any intensification of drug therapy. For patients with an SBP more than slightly elevated, the CDS system led to higher rates of intensification by MDs. We also found that intensification occurred less often when the mean age of the panel of patients was older; possibly because older patients are more likely to have comorbid conditions that make intensification of drug therapy riskier.

**Impacts:**
These findings support the need for quality measures for HTN that take account of individual patient factors, and for similarly individualized clinical decision support.