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Automation of Medical Physics Consult Write-Ups: A Web-Based Tool for Streamlining Clinical Documentation

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ABSTRACT

Medical Physics Consults (MPCs) are essential clinical documentation yet composing them from static templates is time-intensive and error-prone. We developed QuickWrite, a free, open-source web application that generates standardized, patient-specific MPC write-ups from simple structured inputs (physician, physicist, treatment site, and consult-specific parameters). Patient names are deliberately excluded from the tool to maintain HIPAA compliance.

In a single-center study, six physics residents self-reported write-up times using the legacy template workflow (n = 130) and QuickWrite (n = 82). Mean write-up time decreased from 4.82 to 1.00 minutes (79.3% reduction), and median time decreased from 3.31 to 0.54 minutes (83.6% reduction), saving approximately 9 hours per month at our clinical volume of ~150 MPCs.

QuickWrite has been adopted as daily standard practice and includes configurable clinic profiles, allowing other institutions to adopt it in minutes.

INTRODUCTION

Medical Physics Consults document the physicist's findings for a wide range of procedures: image fusions, prior dose evaluations, pacemaker assessments, DIBH, SBRT, SRS/SRT, TBI, and HDR brachytherapy. They serve four critical roles: patient safety (verifying treatment parameters and special procedures), communication (conveying the physicist's assessment to the physician and staff), compliance (required documentation for QA and accreditation), and legal protection (a record of physics review and recommendations).

Historically, our clinic composed MPCs by selecting static templates and manually editing contents, grammar, and format. This workflow was time-intensive (retyping the same physician's name up to four times, deleting placeholder text), cognitively demanding ("Frankensteining" composite write-ups for multi-modality fusions or DIBH-SBRT cases), inconsistent between physicists, and error-prone. We asked: why spend so much time templating when that time could be spent on the clinical assessment itself?

METHODS AND MATERIALS

We first constructed step-by-step MPC logic maps covering the majority of consult scenarios: general MPCs (prior dose, pacemaker, SBRT, SRS/SRT, TBI, HDR, DIBH) and fusion MPCs (MRI/CT, PET/CT, CT/CT; rigid or deformable; single or multiple studies). We utilized these logic maps to identify the minimum required inputs for each write-up type.

These logic maps were then implemented as QuickWrite, an interactive web application built with a modern stack (Next.js frontend deployed on Vercel, backend hosted on Railway, version control via GitHub). The user selects a module, enters parameters through dropdown menus and input fields, and clicks "Generate" to produce a complete, grammatically correct, standardized write-up ready to paste into the patient's chart. Patient names are excluded from the tool for HIPAA PHI compliance.

To evaluate impact, six physics residents self-reported write-up completion times for the legacy template workflow (baseline, n = 130) and QuickWrite (n = 82) across all module types.

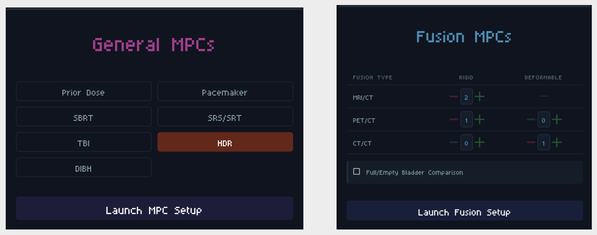

Figure 1. Screenshot of the QuickWrite input interface (module selection).

RESULTS

QuickWrite substantially reduced documentation time across every module. Mean write-up time decreased from 4.82 minutes (baseline) to 1.00 minute (QuickWrite), a 79.3% mean reduction; median time decreased from 3.31 to 0.54 minutes, an 83.6% median reduction. The absolute mean savings of 3.83 minutes per write-up corresponds to approximately 9 hours saved per month at our clinical volume of ~150 MPCs.

At the module level, time reductions ranged from 37.9% (SBRT) to 96.8% (multi-study fusions with all image sets). High-volume modules such as single fusions (77.3%), DIBH (79.8%), and prior dose with single overlap (66.3%) all showed large improvements. Composite scenarios that previously required manually merging multiple templates like the multi-modality fusions and DIBH-SBRT combinations benefited the most, as QuickWrite assembles these write-ups automatically from a single input form.

Table 1. Module-level write-up time reduction with QuickWrite.

Module	Legacy Data Submissions	QuickWrite Data Submissions	Reduction (%)
DIBH	17	11	79.8
Full/Empty	7	4	88.9
Fusion (Multi-All)	2	3	96.8
Fusion (Multi-Single)	8	16	77.6
Fusion (Multi-Two)	13	3	85.3
Fusion (Single)	21	16	77.3
HDR	7	5	84
Prior Dose (No Overlap)	10	4	80.3
Prior Dose (Overlap Multiple)	2	1	79
Prior Dose (Overlap Single)	19	4	66.3
SBRT	9	6	37.9
SRS/SRT (Multiple)	2	3	86
SRS/SRT (Single)	8	2	80.6
TBI	5	4	76.7

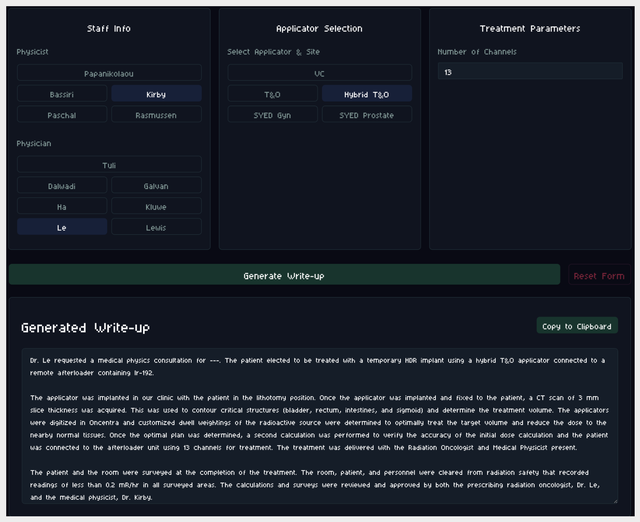

Figure 2. Screenshot of the QuickWrite input interface (parameter entry) and a generated writeup.

DISCUSSION

The largest gains occurred where the legacy workflow demanded the most manual assembly: composite and multi-study write-ups. The smallest gain (SBRT, 37.9%) reflects the irreducible time required to transcribe plan statistics such as coverage, conformity index, and R50, inputs that must still be entered manually.

Beyond speed, QuickWrite standardizes format and completeness across physicists, an implicit quality benefit, and reduces cognitive load by shifting mental effort from formatting to clinical assessment. Quality control included verifying that generated write-ups contain all required elements, confirming parameters are correctly incorporated, and comparing outputs for identical scenarios. Version control, an update log, and user feedback drive iterative refinement.

Limitations: this is a single-center study with self-reported timing, and error-rate reduction was not directly measured. Nonetheless, QuickWrite is now used daily by all residents as standard practice.

CONCLUSIONS

QuickWrite reduced mean MPC write-up time by 79.3% (median 83.6%), saving roughly 9 hours of physicist time per month at our center while standardizing documentation across users. The tool is free, requires no installation or technical expertise, and supports customizable clinic profiles with staff presets, module toggles, and module-specific settings (equipment, planning systems, applicators). This allows a new institution to configure a working profile in under five minutes. The code is open source under an MIT license for institutions wishing to customize beyond the built-in settings. Future work includes ongoing bug fixes, expanded module coverage, and a developer guide to simplify institutional customization.

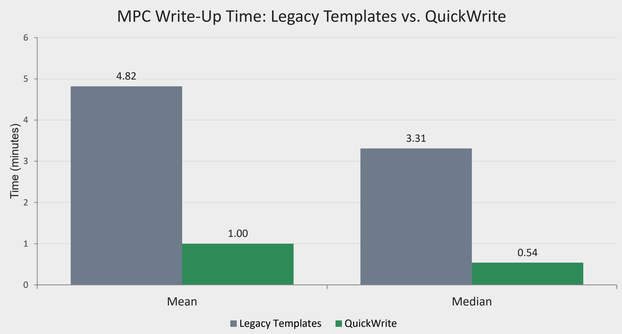

Chart 1. Write-up time, legacy templates vs. QuickWrite.

REFERENCES

1. QuickWrite web application. https://residency-tk2.vercel.app/
2. QuickWrite source code (MIT license). https://github.com/Flep-Glop/residency-tk2

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