Materials and Methods
- Gafchromic film was used to measure dose from an Ir-192 source passing through various thicknesses of stainless steel (1-5 mm). Two different experimental setups were used to capture i) planar dose 2 cm above catheters and ii) percent depth dose.
  - For the planar dose measurements, the steel samples were placed first 1 cm away from the film plane, and then again directly adjacent to the film to characterize dose enhancement. All measurements were compared to dose in solid water only.
  - A Monte Carlo simulation was performed using egss_brachy (from EGSnrc) to model the PDD measurement from a single dwell position.

Results
- Dose measured on a plane 2 cm above the catheters was reduced by 7.4 ± 6.9% (1 mm steel) to 26.5 ± 5.5% (5 mm steel) compared to water alone, Fig 1.
- Dose enhancement on the order of 5% was seen when film adjacent to metal - PDD measurements showed shielding of 21.1 ± 5.3% (film) and 16.3 ± 0.9% (Monte Carlo) in the range of 15-20 mm away from the catheters. This was measured with the 5 mm thick piece of stainless-steel.

Introduction
Personalized applicators are becoming increasingly popular due to the ability to improve dose delivery to patients. Improving fit or including shielding capabilities are among the most prevalent reasons for creating personalized applicators.

Purpose
To characterize 3D-printed stainless steel metal samples in the presence of an Iridium-192 source for organ-at-risk sparing in gynecologic brachytherapy.

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Conclusion
A maximum shielding value of 26.5 ± 5.5% was measured using the planar geometry for the 5 mm steel sample. Increasing the thickness to 10 mm gives a shielding value of ~30% (using MC). The weight of steel at a thickness for substantial shielding will be quite high (few kgs), making this material less preferable to one with a higher density. To eliminate any dose enhancement, an outer shell of plastic could be used. This work resulted in development of a validated method for characterizing potential 3D printing materials using Gafchromic film and egss_brachy MC simulations.