

# Billing Bonanza: Improving Resident Knowledge of the 2021 Revised American Medical Association Outpatient Billing Guidelines Through Gamification

Whitney Lynch, MD\*, Devin Oller, MD

\*Corresponding author: [wlynch@mcw.edu](mailto:wlynch@mcw.edu)

## Abstract

**Introduction:** Residents often feel unprepared for independent practice, citing an unfamiliarity with billing as a common cause. Gamification has been well studied as a means to engage learners but not as a way to improve resident knowledge of outpatient billing guidelines. **Methods:** We delivered a session to incoming PGY 1 residents with a goal of improving billing proficiency. The session included a pretest and posttest questionnaire, a prerecorded PowerPoint lecture, and Billing Bonanza, a game with instructions and rules that used gamification to reinforce billing concepts. **Results:** Residents demonstrated improvement in percentage of correctly answered questions from 42% on the pretest to 67% on the posttest, which resulted in a statistically significant increase of 0.24 questions correct. **Discussion:** This session led to improvement in baseline billing knowledge.

## Keywords

Billing, Gamification, Case-Based Learning, Games, Internal Medicine, Practice Management, Systems-Based Practice

## Educational Objectives

By the end of this activity, learners will be able to:

1. Identify key changes enacted by the 2021 outpatient billing guidelines.
2. Assemble the key elements of a level 4 and level 5 new patient visit and a level 3, level 4, and level 5 follow-up note.
3. Determine the coding level of sample outpatient scenarios.

## Introduction

In 2021, the American Medical Association revised its outpatient billing guidelines, creating a simpler approach to fulfilling coding levels.<sup>1</sup> The new guidelines present a challenge for educators at the graduate medical education level: to create impactful and engaging didactics on a topic that learners do not always perceive as critical during residency but, after graduation, wish they had had exposure to.<sup>2</sup>

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In resident education, a game-based approach offers a unique means of engagement that can capture learners' attention and rival digital content. In the context of education, games can strengthen problem-solving, collaboration, and communication.<sup>3</sup> Several studies have found positive outcomes from gamification. One study sought to promote high-value care using a game-based approach to anemia, and the session was well received.<sup>4</sup> Another study noted that 100% of participating family medicine residents found gamifying pharmacology "enjoyable, an opportunity for learning, and something they would look forward to in the future."<sup>5</sup> Several resources have been published in *MedEdPORTAL* in recent years alone,<sup>4,6,7</sup> but these have focused on clinical topics rather than on residents' proficiency in systems-based practice. What we sought to add to the literature was the use of gamification on a novel topic.

Specific to this project, interactive documentation and billing curricula have demonstrated benefit to residents. In a study by Patel and colleagues, 100% of survey respondents felt a billing discussion with hands-on learning helped improve their documentation.<sup>8</sup> Literature and curricula based on the 2021 revised guidelines are limited, so demonstration of knowledge acquisition through a game-based approach might prove valuable to institutions looking to strengthen their residents'

billing proficiency. Additionally, billing compliance is at the core of the systems-based practice ACGME milestone.<sup>9</sup>

Becoming more proficient in billing may improve trainees' time-efficiency and legal compliance in future practice, with the immediate effect of potential decreases in institutional losses from underbilling. One residency program has already generated data supporting the idea that implementation of the new guidelines in practice leads to higher billing as evidenced by "a modest increase in level 4 codes and a substantial decrease in level 2 codes."<sup>10</sup>

## Methods

Incoming internal medicine PGY 1 residents at both the Medical College of Wisconsin in Milwaukee and the University of Kentucky in Lexington were required to attend an outpatient orientation at their respective institutions. Included in this orientation was an hour-long time slot in which to discuss the basics of outpatient billing. No prerequisite learning was required by the trainees in order to attend this lecture. Facilitators were required to know how to fulfill a level 3, level 4, and level 5 new and established patient visit. Additionally, facilitators were required to know that the revised 2021 AMA billing guidelines simplified documentation requirements, with code level now determined by either time spent or medical decision-making, while history and exam should include only what is medically necessary to complete that encounter level.

The following protocol was approved and deemed exempt by the Medical College of Wisconsin and the University of Kentucky independent Institutional Review Boards. The 1-hour multicenter workshop was presented to incoming PGY 1 internal medicine residents at each institution. The workshop involved the residents completing a pretest questionnaire (Appendix A), listening to a prerecorded PowerPoint lecture (Appendices B-E), and playing Billing Bonanza, a billing game (Appendices F-H). Residents then completed a posttest questionnaire (Appendix A) and were given answers with explanations for the pre- and posttest questions (Appendix I) to independently review.

During the first few minutes of the workshop, trainees at each institution were each asked to complete a pretest by choosing a coding level (level 3, level 4, or level 5) for three case-based scenarios. After the pretest, we played a 17-minute prerecorded PowerPoint that focused on the revisions to the 2021 AMA billing guidelines and the elements that should be considered to accurately determine a coding level (i.e., time spent vs. medical decision-making). After listening to the prerecorded billing lecture, we distributed Billing Bonanza, a billing game that

included a deck of playing cards, die, instructions, rules, and a tallying system, to groups of up to four residents. Prior to starting the game, the residents reviewed the instructions and drew their cards from each deck. The game was played for 20 minutes, with facilitators circulating among the resident groups to answer questions and provide clarification about game rules or billing guidelines. After completing the game, residents were asked to complete a posttest questionnaire, which again asked them to choose a coding level based on three different cases. Of note, case-based scenarios in the pretest were unique and differed from those in the posttest.

The comparison between the pre- and posttest questionnaires served as our assessment tool. We developed the pretest questionnaire to include three case-based scenarios that asked learners to review a three- to four-sentence patient encounter and determine the appropriate coding level (3, 4, or 5) based on that encounter. We then compared these responses to those in the posttest questionnaire, which also included three case-based scenarios (different from those in the pretest). A paired *t* test was used to analyze differences in correct responses of learners between the pretest and posttest.

## Results

The workshop at the University of Kentucky was delivered by a faculty facilitator (assistant professor of medicine and associate program director) to 27 interns, 55% male and 45% female, and the workshop at the Medical College of Wisconsin was delivered by a faculty facilitator (assistant professor of medicine) to 28 interns, 46% male and 54% female. We reviewed the percentage of correct answers for each question to assure that no question was unexpectedly difficult or easy. There were six questions in total (Q1-Q3 from the pretest and Q4-Q6 from the posttest). Percentage correct for each question was as follows: Q1, 69%; Q2, 33%; Q3, 29%; Q4, 64%; Q5, 60%; and Q6, 80%. Pretest average correct was 42%, and posttest average correct was 67%. We used a paired *t* test to assess the difference in pretest correct versus posttest correct and found this to be an increase of 0.24 questions correct (95% CI, 0.13-0.35, *p* < .05).

## Discussion

This multicenter billing workshop utilizing gamification led to significant knowledge acquisition amongst incoming internal medicine PGY 1 residents. Residents at this level were the target audience for the discussion as they deliver a lower percentage of accurately coded notes. However, evidence indicates that even PGY 3 residents underbill by up to 42.9% and overbill by up to

17.9%.<sup>11</sup> This suggests that trainees at every level would benefit from a billing curriculum, but intervention should occur during the first year.

Pretest results were notable for low baseline knowledge of appropriate billing levels, suggesting that increased exposure to billing curricula is needed at both the UME and GME levels to build proficiency. Though no specific data were collected to assess learner perception, the workshop appeared well received by participants, with facilitators noting frequent questions from participants throughout the game, a competitive spirit among learners, and peer-to-peer teaching of key billing concepts. Further study is needed to measure engagement in the Billing Bonanza game with validated surveys, but this pilot's impact on resident knowledge should encourage expansion of the workshop to other institutions.

In interpreting the results of our project, it should be acknowledged that each intern likely had a different baseline knowledge of billing prior to our discussion and that the percentage of pretest responses correct is only a surrogate marker of prior exposure (interns were not asked about number of hours of prior teaching on this topic). It could prove beneficial to add a baseline survey to better assess previous billing exposure. While billing is not a curriculum built into most medical schools, pilot studies teaching billing principles to medical students have been reported.<sup>12</sup> Additionally, the Centers for Medicare & Medicaid Services made revisions to medical student documentation in 2018, doing away with the teaching physician's need to redocument their work,<sup>13</sup> which likely led to an increase in students' exposure to billing. Another limitation of our project is the exclusion of PGY 2 and PGY 3 residents, as there are data suggesting these trainees could also benefit from a billing discussion, as mentioned above.<sup>11</sup> Last, due to the short length of the questionnaire, it is unclear if a 0.24 increase in questions correct is meaningful, so lengthening the survey may be warranted for future applications. However, as the questions focused on the learner's ability to differentiate a low medical decision-making encounter from a moderate or high medical decision-making encounter, this modest gain in billing knowledge, if knowledge retention is high, could translate to significant increases in the accuracy of moderate or high medical decision-making encounters. A follow-up survey that assesses retention of knowledge and real-world coding changes would aid in determining the clinical impact of wider dissemination of the workshop.

There is much to be gained from future studies that evaluate gamification's place in medical education. All game-based

learning is not created equal, and it is important to evaluate the unique educational circumstances that game-based learning best serves.<sup>14</sup> While it is debated whether gamification appeals most to those who are intrinsically motivated versus those who are extrinsically motivated,<sup>15</sup> recent literature does support the theory that active learning in general promotes critical thinking and evokes motivation.<sup>16</sup> Gamification centers on participation and allows learners to be tested and to exercise spaced repetition—two effective learning tools in medical education that promote retention.<sup>17</sup> In addition to improving recall, games have been shown to promote engagement,<sup>18</sup> which, in turn, positively impacts learning outcomes.<sup>19</sup> Given this interplay, future applications of the billing workshop should assess how resident learning preferences impact both knowledge acquisition and engagement. Continued exposure through recurring sessions may also demonstrate a positive impact on accuracy of clinical documentation.

## Appendices

- A. Pretest and Posttest Questionnaires.docx
- B. Prerecorded PowerPoint Part 1.mp4
- C. Prerecorded PowerPoint Part 2.mp4
- D. Prerecorded PowerPoint Part 3.mp4
- E. Prerecorded PowerPoint Transcript.docx
- F. Billing Bonanza Instructions.pptx
- G. Billing Bonanza Game Cards.docx
- H. Billing Bonanza Game Cards Printout.docx
- I. Pretest and Posttest Answers.docx

*All appendices are peer reviewed as integral parts of the Original Publication.*

**Whitney Lynch, MD:** Assistant Professor, Department of Medicine, Medical College of Wisconsin; ORCID:  
<https://orcid.org/0000-0002-3347-2325>

**Devin Oller, MD:** Assistant Professor, Department of Medicine, University of Kentucky College of Medicine

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## Ethical Approval

The University of Kentucky Institutional Review Board and the Medical College of Wisconsin Institutional Review Board deemed further review of this project not necessary.

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