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# Collaborative Physician-Pharmacist–Managed Multiple Myeloma Clinic Improves Guideline Adherence and Prevents Treatment Delays

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**QUESTION ASKED:** What is the impact of a collaborative physician-pharmacist–managed multiple myeloma (MM) clinic on various clinical (adherence to treatment and supportive care guidelines) and operational (treatment delays) measures related to the management of patients with MM?

**SUMMARY ANSWER:** Our collaborative MM practice model of incorporating another subspecialized individual, such as a clinical pharmacist, who is trained in oncology resulted in increased adherence to core supportive care measures, such as bisphosphonate use, antiviral and *Pneumocystis jirovecii* pneumonia (PJP) prophylaxis, influenza vaccination, and venous thromboembolism (VTE) prophylaxis. The pharmacist was also important in reducing delays in acquiring oral immunomodulatory imide drugs (IMiDs) and assisting patients in copayment coverage.

**WHAT WE DID:** We initiated a collaborative MM clinic, whereby one of two dedicated board-certified oncology pharmacists, working with a myeloma-focused hematologist, provided consultation for every new and continuing patient. Clinical measures were analyzed retrospectively after the first year of the collaborative practice and compared with those of patients being treated during the previous year, in which patients were cared for by the same specialist physician, and ad hoc clinical pharmacist consultation was available only on request (traditional clinic). In the collaborative myeloma clinic, the clinical pharmacist provided medication-related education, completed medication therapy management, monitored for adherence and treatment-related toxicity, recommended management of toxicity and supportive care on the basis of evidence-based guidelines, and navigated issues of insurance approval for and access to oral specialty medications. All patients received a printed medication list generated by the pharmacist. In addition, in the collaborative model, the physician and clinical pharmacist made treatment recommendations that encompassed all key clinical areas identified as interventions necessary on the basis of national guidelines. These included VTE risk stratification and prophylaxis, anti-infective drugs indicated (antiviral, antibacterial, and prophylaxis for PJP), bisphosphonate use for bone health, and timely and appropriate administration of vaccinations. In addition to these clinical responsibilities, the pharmacist assisted in the enrollment of patients on the basis of risk for embryo-fetal harm in the required Risk Evaluation and Mitigation Strategies program and counseled patients on the procedures necessary to obtain IMiD specialty drugs.

**WHAT WE FOUND:** The collaborative clinic led to significant improvements in adherence to supportive medications such as bisphosphonates, calcium and vitamin D, and acyclovir and PJP prophylaxis. Appropriate VTE prophylaxis in IMiD-treated patients was prescribed in 100% versus 83% of patients ($P = .0035$). The median time to initiation of bisphosphonate (5.5 *v* 97.5 days; $P < .001$) and PJP prophylaxis after autologous transplantation was shortened in the collaborative clinic (11 *v* 40.5 days; $P < .001$). Furthermore, the number (85% to 21%; $P < .001$) and duration (7 *v* 15 days; $P = .002$) of delays in obtaining IMiD therapy were also significantly reduced.

**BIAS, CONFOUNDING FACTOR(S), REAL-LIFE IMPLICATIONS:** Clearly a potential barrier to widespread use may be the availability of specialized clinical pharmacists in general oncology practice. In these settings, it may be that other strategies, such as systems modifications or use of information technology, may be more cost effective and necessary to produce similar results. A collaborative physician-pharmacist model may be of benefit in the management of other complex malignant diseases, and therefore, additional studies in other cancer clinics will be of importance. Future studies evaluating long-term clinical outcomes such as VTE- and infectious disease–related events will be needed to prove the full benefit of this collaborative approach. JOP

# Collaborative Physician-Pharmacist–Managed Multiple Myeloma Clinic Improves Guideline Adherence and Prevents Treatment Delays

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## Abstract

### Purpose

We hypothesized that a multidisciplinary collaborative physician-pharmacist multiple myeloma clinic would improve adherence to treatment and supportive care guidelines as well as reduce delays in receiving oral antimyeloma therapy.

### Methods

From March 2014 to February 2015, an oncology pharmacist provided consultation for all patients in a specialist myeloma clinic. This included reviewing medications, ensuring physician adherence to supportive care guidelines, managing treatment-related adverse effects, and navigating issues involving access to oral specialty medications (collaborative clinic).

### Results

Outcome measures were retrospectively compared with those of patients being treated by the same physician during the previous year, in which ad hoc pharmacist consultation was available upon request (traditional clinic). The collaborative clinic led to significant improvements in adherence to supportive medications, such as bisphosphonates (96% *v* 68%; $P < .001$), calcium and vitamin D (100% *v* 41%; $P < .001$), acyclovir (100% *v* 58%; $P < .001$), and *Pneumocystis jirovecii* pneumonia prophylaxis (100% *v* 50%; $P < .001$). Appropriate venous thromboembolism prophylaxis in immunomodulatory drug–treated patients was prescribed in 100% versus 83% of cases ($P = .0035$). The median time to initiation of bisphosphonate (5.5 *v* 97.5 days; $P < .001$) and *P jirovecii* pneumonia prophylaxis after autologous transplantation was shortened in the collaborative clinic (11 *v* 40.5 days; $P < .001$). Furthermore, the number (85% *v* 21%; $P < .001$) and duration (7 *v* 15 days; $P = .002$) of delays in obtaining immunomodulatory drug therapy were also significantly reduced.

### Conclusion

Our collaborative clinic model could potentially be applied to other practice sites to improve the management of patients with multiple myeloma. Prospective studies analyzing clinical outcomes, patient satisfaction, and cost effectiveness of this approach are warranted.

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## INTRODUCTION

Multiple myeloma (MM) is a plasma-cell disorder characterized by uncontrolled clonal plasma-cell proliferation in the bone marrow, production of monoclonal protein in the blood and/or urine, and associated organ dysfunction.[1] It is the second most common hematologic malignancy, with an annual incidence of 6.6 new cases per 100,000 men and women in the United States.[2] The overall survival (OS) of patients with MM has improved in the last decade, predominantly because of the incorporation of novel therapies, including immunomodulatory drugs (IMiDs) and proteasome inhibitors (PIs) in upfront treatment. Although these modern treatments have significantly prolonged OS and progression-free survival through improved disease control, a majority of patients remain incurable and live with the burden of the disease itself and the cumulative adverse effects of treatments.[1,3]

MM is a complex disease requiring adherence to treatment guidelines, patient education, and timely delivery of antimyeloma drugs to achieve optimal patient care.[3,4] In particular, evidence-based supportive care plays an important role in the management of MM. Interventions related to bone disease, renal failure, hematologic toxicity, thromboembolism, infection, and peripheral neuropathy are vital in improving survival in patients with MM, but adherence can be difficult, given the complexity of the disease and treatment regimens.[4] In addition, oral antimyeloma therapies, particularly IMiDs, are central in most treatment regimens but can be challenging to initiate in a timely fashion because of strict prescribing regulations and the cost of therapy.[5]

Often the management of MM falls primarily on the treating hematologist, who must take on several responsibilities that encompass every aspect of care, including MM treatment decisions, patient education and monitoring, adherence to guidelines for supportive care, and timely acquisition of MM drugs. Hematology/oncology clinical pharmacists play an important role in the delivery of care for individuals living with cancer.[6-8] As an integral part of the multidisciplinary cancer care team, clinical pharmacists can participate in evidence-based care and play a role in patient education. Indeed, strategies implementing a clinical pharmacist directly into oncology care delivery have been published.[9-11] For example, pharmacists have been integrated into hematology/oncology clinics with the aims of improving supportive care, enhancing education of patients receiving chemotherapy, and improving efficiency in the chemotherapy infusion unit.[11] Additional areas of study include pain assessment, nausea and vomiting, treatment-related adverse effect management, palliative care, programs dedicated to the monitoring of oral anticancer regimens, and follow-up of patients undergoing hematopoietic stem-cell transplantation.[9,12-15] As this literature shows, the role of clinical pharmacists in oncology care is expanding. However, ad hoc consultation and often evaluation of patients independent of physicians continue to be the standard practice. There is a paucity of literature outlining experience with collaborative physician-pharmacist patient care in cancer care, especially where supportive care plays a major role in the pathogenesis and progression of the disease. We therefore aimed to analyze the impact of a collaborative physician-pharmacist–managed MM clinic on various clinical measures related to the management of patients with MM.

## METHODS

In March 2014, we initiated a collaborative MM clinic at the University of Illinois Oncology Cancer Center, whereby one of two dedicated board-certified oncology pharmacists, working with a myeloma-focused hematologist, provided consultation for every new and continuing patient. Clinical measures (described in Data Collection) were analyzed retrospectively after the first year of the collaborative practice (March 2014 to February 2015) and compared with those of patients being treated during the previous year, in which patients were cared for by the same specialist physician and ad hoc clinical pharmacist consultation was available only on request (traditional clinic). All patients with symptomatic MM seen within the study period were included in the analysis. Approval of the University of Illinois at Chicago Institutional Review Board was obtained before data collection.

### Infrastructure and Workflow

The oncology cancer center at our institution is part of an urban academic medical center that serves predominantly minority patients. The MM clinic is managed by a myeloma-focused hematologist. A pharmacy is located within the oncology clinic that is dedicated to dispensing infusional chemotherapy and specialty drugs, including immunomodulatory agents such as lenalidomide and pomalidomide. IMiD prescriptions were filled at the oncology cancer center pharmacy if the patient preferred and as long as insurance did not restrict it. Three pharmacy technicians and three pharmacists staff our pharmacy. In addition, the University of Illinois at Chicago Clinical

Pharmacy Oncology Program consists of three outpatient and two inpatient board-certified oncology clinical pharmacists who are available for ad hoc consultation. The infrastructure and personnel were identical between the year of traditional and collaborative clinics.

In the collaborative clinic, patients were seen in one of three clinic rooms in the oncology clinic. Once the patient was assigned a room, the clinical pharmacist would see the patient first and provide the consultation services outlined in Role of the Clinical Pharmacist. Then the physician and in some cases the hematology trainee would see the patient. Afterward, there would be a discussion between the physician and pharmacist regarding the assessment and plan for each patient. Finally, the entire team saw the patient together to provide the final plan to the patient.

## Role of the Clinical Pharmacist

In the collaborative myeloma clinic, the clinical pharmacist provided medication-related education, completed medication therapy management, monitored for adherence and treatment-related toxicity, recommended management of toxicity and supportive care on the basis of evidence-based guidelines, and navigated issues of insurance approval for and access to oral specialty medications. The pharmacist used a template outlining all these key areas to ensure that these interventions were addressed at each visit. In particular, the pharmacist completed a comprehensive medication history and reviewed the treatment regimen, including indication, treatment schedule, goal and duration of therapy, administration instructions (eg, take with or without food), plan for missed doses, potential toxicities (including infertility risk), necessary laboratory monitoring, drug-drug and drug-food interactions, safe storage and disposal instructions for oral antimyeloma drugs, and how to contact the oncology provider and pharmacist. All patients received a printed medication list generated by the pharmacist in this clinic.

In addition, in the collaborative model, the physician and clinical pharmacist made treatment recommendations that encompassed all key clinical areas identified as interventions necessary on the basis of national guidelines. These included venous thromboembolism (VTE) risk stratification and prophylaxis, anti-infective drugs indicated (antiviral, antibacterial, and prophylaxis for *Pneumocystis jirovecii* pneumonia [PJP]), bisphosphonate use for bone health (drug, dose, dose adjustment, contraindication, and monitoring), and timely and appropriate administration of vaccinations (eg, influenza, pneumococcal, and meningococcal). These recommendations were based on the International Myeloma Working Group and American Society of Bone Marrow Transplantation guidelines and tailored to adhere to the individual patient's comorbidities (eg, age, renal function, and contraindications) and clinical status.[16-19]

## Process for IMiD Prescribing

In addition to these clinical responsibilities, the pharmacist assisted in the enrollment of patients on the basis of risk for embryo-fetal harm in the required Risk Evaluation and Mitigation Strategies (REMS) program and counseled patients on the procedures necessary to obtain the IMiD specialty drugs. Required components of the REMS program included certification of the oncology provider through REMS program enrollment, a signed patient-physician agreement form, pregnancy testing for women of child-bearing potential, and mandatory completion of confidential patient and prescriber surveys. The pharmacist completed the counseling checklists required by the REMS program for all patients receiving an IMiD during this clinic. After enrollment and counseling were completed, the prescription was reviewed and sent for benefits investigation. For patients who faced financial barriers, alternative funding sources, such as patient assistance programs and grant funding, were investigated further in collaboration with the dispensing pharmacist and/or social worker. During both the collaborative and traditional clinics, a dedicated pharmacy technician assisted in obtaining prior authorizations, enrolling the patient in copayment assistance or grant programs, and coordinating medication procurement. The clinical pharmacist served as a liaison with the dispensing pharmacy for all patients, and therefore, all patients received assistance with financial and insurance issues.

## Data Collection

All patients diagnosed with active MM receiving active treatment seen during the study period were included in the analysis. Data on baseline patient characteristics and clinical variables were extracted retrospectively from the electronic medical record. As previously mentioned, clinical pharmacists provided a wide spectrum of clinical and administrative services; however, because of the retrospective nature of our study, only certain variables were measurable and therefore included in the final analysis. The following clinical measures were collected and compared between the two time periods: adherence to bisphosphonates, defined as administration of

either zolendronic acid or pamidronate during the study period, and time to initiation of the bisphosphonate from diagnosis as well as time to reinitiation after autologous stem-cell transplantation (ASCT); appropriate VTE prophylaxis during IMiD treatment assessed by first determining the patient's VTE risk, on the basis of the presence of known VTE risk factors in each patient, and subsequently the type and duration of VTE prophylaxis collected and assessed for appropriateness (eg, low-risk patient received aspirin *v* high-risk patient received low molecular weight heparin); use of PJP prophylaxis after ASCT (pentamidine or sulfamethoxazole-trimethoprim) as well as the time to initiation of these agents after ASCT; antiviral (acyclovir or valacyclovir) prophylaxis during PI-based treatment; and administration of the influenza vaccination during that year. These measures were chosen as data that could be clearly and directly obtained from the electronic medical record.

### Statistical Analyses

For statistical analyses, categorical data were analyzed by $\chi^2$ test and Fisher's exact test with cells less than five. Continuous data were analyzed by *t* test. Comparison of medians was performed using the Wilcoxon rank-sum test. Time to events such as bisphosphonate and PJP prophylaxis initiation were assessed using the Kaplan-Meier method and log-rank test.

## RESULTS

### Baseline Characteristics

During the 12-month period of the collaborative MM clinic, among 551 physician clinic visits, the pharmacist had 399 documented encounters with 57 patients. In contrast, during the previous year of a traditional MM clinic, among 355 physician clinic visits, the pharmacist had 26 documented encounters with 44 patients (7.3% *v* 72.4%; $P < .001$). Baseline characteristics including age, sex, race, International Staging System, median prior lines of therapy, and protein subtype were similar between the two time periods (Table 1). Forty-two patients (74%) seen during the collaborative clinic actively received treatment with either an IMiD- (n = 22) or PI-based regimen (n = 20). Thirty-nine patients (88.6%) seen during the traditional clinic actively received treatment with either an IMiD- (n = 22) or PI-based regimen (n = 17). Twenty-five (44%) versus 12 patients (27%) had undergone ASCT (before study period) during the collaborative and traditional clinics, respectively ($P = .69$). During the study period, 24 (42%) versus 21 patients (48%) underwent ASCT in the collaborative and traditional clinics, respectively. Twenty-nine and 13 patients were prescribed post-ASCT lenalidomide maintenance during the collaborative and traditional clinics, respectively.

### Outcome Measures

#### *Guideline adherence*

We compared the following five clinical measures related to national MM guideline adherence between the two groups: adherence to bisphosphonates, administration of influenza vaccination, post-ASCT PJP prophylaxis, antiviral prophylaxis during PI-based treatment, and appropriate VTE prophylaxis during IMiD-based treatment (Fig 1).

We observed increased prescription of bisphosphonates (zolendronic acid or pamidronate) in the collaborative clinic (55 [96%] *v* 30 patients [68%]; $P < .001$; Fig 1A). Among patients receiving bisphosphonates, the median time to initiation from diagnosis was 5.5 versus 97.5 days ($P < .001$) in the collaborative and traditional clinics, respectively. Furthermore, the time from ASCT to reinitiation of bisphosphonates post-ASCT was also improved in the collaborative clinic (12.5 *v* 135 days; $P < .001$; Fig 1B). One hundred percent (n = 57) versus 41% (n = 18) of patients received concomitant calcium and vitamin D, a supplement that is often recommended to be coadministered during bisphosphonate therapy ($P < .001$; Fig 1A). Appropriate VTE prophylaxis during IMID-based treatment (eg, aspirin *v* low molecular weight heparin or a novel oral anticoagulant) was determined on the basis of an individual patient's number of risk factors for VTE. Risk factors based on International Myeloma Working Group guidelines for VTE prophylaxis in patients receiving thalidomide- or lenalidomide-based treatment are as follows: history of VTE, diabetes, obesity defined as a body mass index greater than or equal to 30, cardiac disease, immobility, chronic renal disease, acute infection, presence of a central venous catheter or pacemaker, recent surgery, blood clotting disorder, concomitant erythropoietin-stimulating agent, multiagent therapy, or concomitant high-dose corticosteroid treatment.[20] We evaluated appropriateness of VTE prophylaxis in patients undergoing both an IMID-based induction (n = 22 in both traditional and collaborative clinics) and post-ASCT IMID maintenance (traditional clinic, n = 13; collaborative clinic, n = 29). On the basis of these guideline recommendations, we observed that among patients receiving any IMID-based

**Table 1. Baseline Characteristics of Patients During the Traditional and Collaborative Clinics**

| Characteristic | No. (%) Physician (n = 44) | No. (%) Physician Plus Pharmacist (n = 57) | P |
|---|---|---|---|
| Sex | | | .99 |
| Male | 27 (61) | 36 (63) | |
| Female | 17 (39) | 21 (37) | |
| Race | | | .75 |
| White | 7 (16) | 14 (25) | |
| Black | 30 (68) | 36 (63) | |
| Hispanic | 5 (11) | 5 (9) | |
| Other | 2 (5) | 2 (3) | |
| Age, years | | | .3 |
| Median | 60 | 59 | |
| Range | 29-87 | 27-86 | |
| ISS stage | | | .88 |
| 1 | 3 (7) | 6 (11) | |
| 2 | 17 (39) | 19 (33) | |
| 3 | 18 (41) | 23 (40) | |
| Unknown | 6 (13) | 9 (16) | |
| Immunoglobulin type | | | .86 |
| IgG | 29 (66) | 36 (63) | |
| IgA | 7 (16) | 8 (14) | |
| Light chain | 8 (18) | 13 (23) | |
| No. of prior therapies | | | .11 |
| Median | 1.5 | 2 | |
| Range | 0-10 | 0-11 | |
| Prior therapy | | | |
| Lenalidomide | 31 (70) | 44 (77) | .5 |
| Pomalidomide | 3 (7) | 6 (10) | .73 |
| Bortezomib | 30 (68) | 45 (79) | .26 |
| Carflizomib | 5 (11) | 7 (12) | .99 |
| ASCT | 12 (27) | 25 (44) | .69 |

Abbreviations: ASCT, autologous stem-cell transplantation; Ig, immunoglobulin; ISS, International Staging System.

regimens, prophylaxis was prescribed in 51 (100%) versus 29 patients (83%) in the collaborative and traditional clinics, respectively ($P = .0035$; Fig 1B).

We then assessed anti-infection prophylaxis, including antiviral prophylaxis during PI-based treatment and PJP prophylaxis post-ASCT. Appropriate use of antiviral prophylaxis was defined as initiation of either acyclovir or valacyclovir during PI-based treatment and continuation for an additional month after discontinuation of PI treatment. Appropriate antiviral prophylaxis during PI-based treatment was observed more frequently in the collaborative clinic (100% *v* 58%; $P < .001$; Fig 1C). Appropriate PJP prophylaxis was defined as initiation of either sulfamethoxazole-trimethoprim or intravenous or inhaled pentamidine within the first 30 days post-ASCT and continuation for a total duration of 6 months. We found that the number of patients receiving appropriate PJP prophylaxis post-ASCT was significantly different (50% *v* 100%; $P < .001$; Fig 1C). In addition, the time to initiation of prophylaxis was shorter in the collaborative clinic (11 *v* 40.5 days; $P < .001$). Finally, influenza vaccination administration was higher in the collaborative clinic (76% *v* 24%; $P < .001$; Fig 1D). Finally, all 57 patients (100%) seen during the collaborative clinic were given at least one medication list, whereas 19 (43%) received one at any point during the traditional clinic ($P < .001$).

### *Treatment delays*

Because IMiDs must follow an REMS enrollment process, treatment delays are often encountered in practice. We analyzed two operational measures related to acquisition of oral antimyeloma therapy: time to initiation of the prescribed oral specialty drug (IMiDs), and number of unplanned IMiD delays experienced throughout the treatment course. A treatment delay was noted if the IMiD was dispensed beyond 7 days of its due date. Of note, data on treatment delays were not available for all patients. In the collaborative clinic, the clinical pharmacist completed REMS enrollment for all patients receiving an IMiD. The median time from when the treatment plan was noted in the medical record to when the IMiD was first filled was 15 days (range, 3-62 days) versus 7 days (range, 0-32 days) in the traditional and collaborative clinics, respectively ($P = .0018$). Nine (21%) of 42 patients in the collaborative group and 23 (85%) of 27 patients in the traditional clinic experienced a treatment delay ($P < .001$; Fig 2).

## DISCUSSION

Treatment outcomes in patients with MM have greatly improved over the past 15 years after the introduction of IMiDs (thalidomide, lenalidomide, and pomalidomide), PIs (bortezomib, carfilzomib, and ixazomib), and monoclonal antibodies (elotuzumab and daratumumab).[4,21-28] The rapid development of novel agents, characterized by their own unique adverse events and pharmacologic considerations, has led to increasing complexity in the care of patients with MM. In addition to the use of novel agents, the duration of therapy in MM has changed, with recent studies showing that continuous

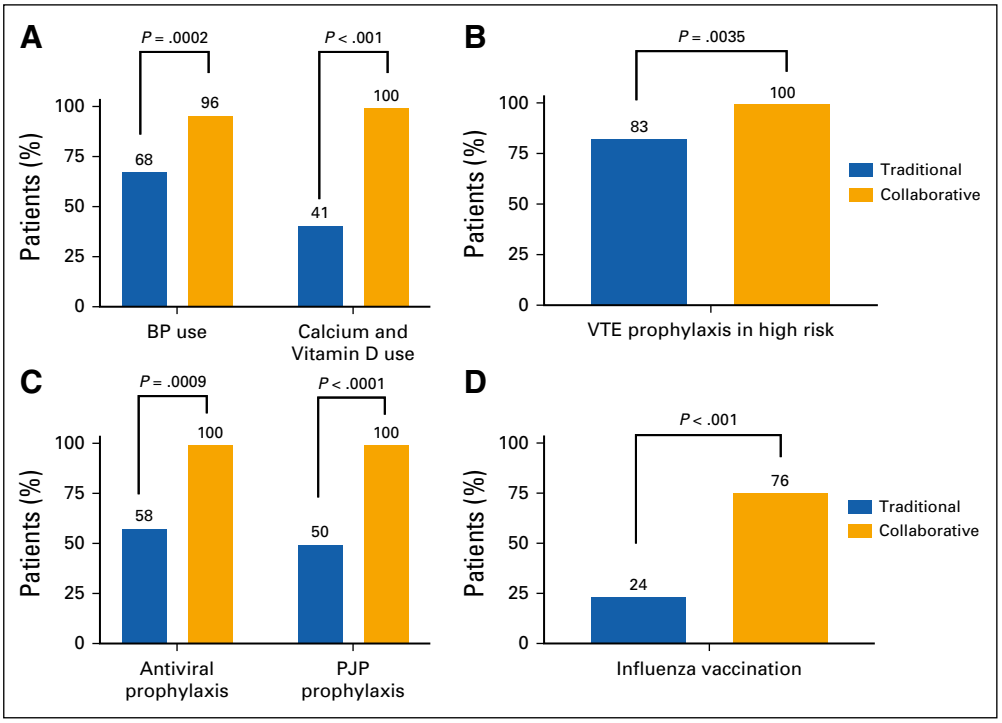


**Fig 1.** Increased use of (A) bisphosphonate (BP) and calcium/vitamin D, (B) appropriate venous thromboembolism (VTE) prophylaxis, (C) antiviral and *Pneumocystis jirovecii* pneumonia (PJP) prophylaxis, and (D) influenza vaccine in patients seen during the collaborative compared with the traditional clinic.

treatment may lead to superior outcomes compared with fixed-term treatment.[29] However, long-term treatment can be difficult to achieve because of substantial burdens, such as adherence to oral antimyeloma drugs, treatment-related toxicities, financial toxicity, and inconvenience of frequent visits for drug administration.[30-32] Finally, the addition of supportive care medications represents an essential component of treatment, which adds additional complexity to the treatment regimen. For all these reasons, access to specialized MM care may become an important determinant of patient outcome. Physician adherence to clinical guidelines and evidence-based consensus recommendations is essential for identifying the therapeutic agents that are active and the supportive care strategies that are necessary throughout the ever-changing life cycle of the disease.

The paradigm of oncology practice has changed significantly in recent years, with the rapid emergence and use of oral anticancer agents.[33] More than 25 million doses of oral oncology drugs are administered annually in the United States. Furthermore, it is estimated that more than 25% of chemotherapy agents in the drug pipeline are oral medications, and this trend is expected to continue.[34] Many of these newer agents demonstrate optimal effects when administered over a prolonged period of time, either intermittently or continuously. Several studies have analyzed barriers to guideline adherence and the impact on clinical outcomes, with specific attention to oral oncology drugs. Barriers to adherence to guidelines for patients receiving tyrosine kinase inhibitors for chronic myeloid leukemia include resource barriers, lack of

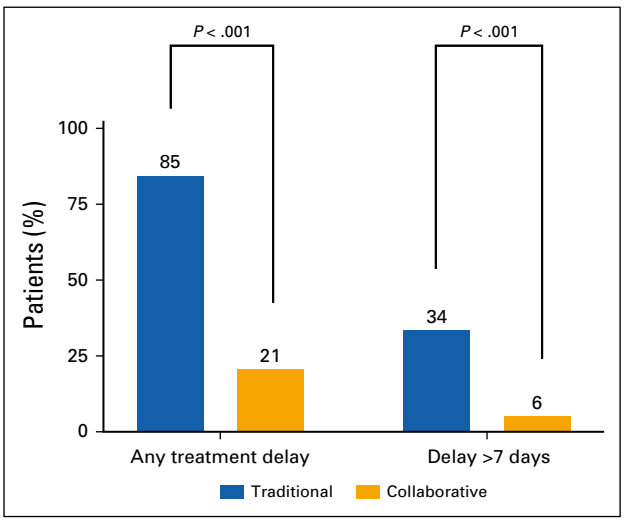


**Fig 2.** Comparison of number of immunomodulatory drug refill delays among patients seen during the collaborative versus traditional clinic.

time to search guidelines, and lack of familiarity with and agreement-restricted guideline adoption.[35]

Our data clearly show that even subspecialized hematologists focused on a single disease may struggle to keep up with these practice challenges. Given the increased survival of patients with MM and the high complexity of their treatment regimens, strategies to improve delivery of care and adherence to guidelines are warranted. We piloted a novel multidisciplinary approach in the management of patients with MM at our institution, where at least one clinical pharmacist was fully dedicated to the clinic at any time. Our strategy of incorporating another subspecialized individual, such as a clinical pharmacist, who is trained in oncology resulted in increased adherence to core supportive care measures, such as bisphosphonate use, antiviral and PJP prophylaxis, influenza vaccination, and VTE prophylaxis. The pharmacist was also important in reducing delays in acquiring oral IMiDs and assisting patients in copayment coverage.

Clearly a potential barrier to widespread use may be the availability of specialized clinical pharmacists in general oncology practice. In these settings, it may be that other strategies, such as systems modifications or use of information technology, may be more cost effective and necessary to produce similar results. Despite this, we propose that based on our preliminary findings, this model of a collaborative clinic is worthy of more widespread study. A larger sample size is required to show improvements in clinical outcomes (eg, infection and VTE rates). Furthermore, a larger study across multiple institutions would be able to definitively conclude whether improvements in practice are the result of pharmacist interventions. As part of larger prospective studies, assessments of medication adherence, patient satisfaction, feasibility, and cost effectiveness/space considerations would be important. We believe that the collaborative model may be of benefit in the management of other complex malignant diseases, and therefore, additional studies in other cancer clinics will be of importance. JOP

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**Authors' Disclosures of Potential Conflicts of Interest**

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## AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

**Collaborative Physician-Pharmacist–Managed Multiple Myeloma Clinic Improves Guideline Adherence and Prevents Treatment Delays**

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