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*Short communication*

# Designing workforce readiness in pharmacy: Evidence from a career lifecycle framework at Alkaloid Skopje

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## Introduction

Pharmacy practice is undergoing structural transformation characterized by expanded accountability for patient safety, medication-use systems, and decision-making within increasingly complex care environments. This evolution has elevated the consequences of performance variability and system weakness, particularly during transitions of care and high-risk situations. The World Health Organization (WHO) underscores the scale of this challenge, estimating that the global cost associated with preventable medication-related harm is approximately US$42 billion annually, largely attributable to system weaknesses during high-risk situations and transitions of care (WHO, 2022).

At the same time, pharmacy workforce dynamics reveal both scale and strain. Global workforce surveillance data indicate that approximately 5.57 million pharmacists are licensed or registered worldwide, although not all are actively practicing (International Pharmaceutical Federation, 2025). However, workforce sustainability is increasingly challenged by workplace pressures and well-being risks. A global survey reported by the Irish Pharmacy Union, drawing on findings from the International Pharmaceutical Federation, indicates that 62% of pharmacist respondents experience burnout or other work-related mental health concerns (Irish Pharmacy Union, 2023). These indicators reveal a widening misalignment between contemporary professional role demands and the scope of traditional educational preparation and early-career support mechanisms. Transitions into professional practice thus represent a critical vulnerability point in pharmacy systems, where inadequate readiness can amplify both workforce strain and patient-safety risk. By reframing workforce readiness as a developmental process, this paper aims to provide practical insights for industry–academia collaboration and sustainable workforce development in pharmacy practice.

## Workforce readiness as a developmental process

Prevailing workforce models often treat readiness as an outcome of credentialing or time-based exposure to practice. However, evidence from pharmaceutical manufacturing contexts challenges this assumption, indicating that tenure alone is an insufficient proxy for early professional effectiveness. Survey-based findings indicate that onboarding engagement is most strongly reflected in intellectual involvement with work tasks, with intellectual engagement items reporting the highest mean values relative to social and affective dimensions (Murgoski, 2023). Importantly, these pattern appear consistent across experience levels, suggesting that readiness gaps do not inherently

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diminish with prolonged exposure to role demands during early employment stages (Murgoski, 2023).

Complementary evidence on onboarding motivation further reinforces this interpretation. Intrinsic motivation, reflected in task meaning, cognitive challenge, and perceived contribution, exceeds extrinsic orientations in pharmaceutical manufacturing onboarding in contexts (Murgoski, 2025). This is consistent with self-determination theory, which identifies competence, autonomy, and relatedness as core psychological drivers of sustained performance in knowledge-intensive environments (Ryan & Deci, 2000).

## Results and framework outcomes

The career lifecycle framework implemented at Alkaloid Skopje builds on earlier empirical work positioning the Young Talents Program as a structured talent management mechanism within the pharmaceutical industry (Murgoski, et al., 2022). The framework integrates early academic engagement, structured transition into practice, and continuous development within a single developmental architecture.

Between program inception and recent evaluation cycles, 1,397 students participated through applied academic cooperation, internships, and mentored industry projects. Structured summer internships functioned as controlled transition environments that enabled both skills development and early assessment of professional readiness. Of 359 interns completing the program, 136 transitioned into permanent employment, representing a conversion rate exceeding one-third. Early employment turnover within this cohort remained between 2 and 4 percent during initial career stages, substantially below early-career attrition levels commonly reported in pharmaceutical workforce studies.

These outcomes are supported by Alkaloid's long-standing collaboration with the Faculty of Pharmacy at Ss. Cyril and Methodius University in Skopje, which systematically aligns academic curricula with industrial practice through internships, joint projects, and mentored engagement, thereby strengthening transition readiness prior to formal employment.

## Conclusion

Workforce readiness in contemporary pharmacy practice should be viewed as a developmental outcome rather than a consequence of education or accumulated tenure alone. Evidence from the Alkaloid Skopje career lifecycle framework suggests that intellectual engagement, intrinsic motivation, and cultural alignment during onboarding may contribute to stronger early professional effectiveness and workforce retention. As pharmacy roles continue to increase in complexity, research-informed workforce development models may become increasingly important for sustainable professional integration and patient-safety oriented practice.

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