

## DRAFT ASHP Statement on Bar-Code-Enabled Medication Administration Technology

### 1 **Position**

2 The American Society of Health-System Pharmacists (ASHP) encourages health systems to  
3 adopt, maintain, and continuously improve bar-code-enabled medication administration  
4 (BCMA) technology to enhance patient safety through accurate medication administration and  
5 documentation. To support the goal of having all medications electronically verified before they  
6 are administered, BCMA systems should be used in all areas of hospitals and health systems in  
7 which medications are used. Pharmacists must lead the planning, implementation, and  
8 management of BCMA systems, ensuring the necessary infrastructure for their success. BCMA  
9 usage should be monitored and tracked to identify and resolve issues and report metrics to  
10 quality committees. Hospitals and health systems deploying BCMA programs must provide the  
11 funding and staffing necessary to permit pharmacists to fulfill this role.

12 ASHP urges the Food and Drug Administration (FDA) and other regulatory agencies,  
13 standard-setting bodies, contracting entities, hospitals and health systems, and others to  
14 mandate that pharmaceutical manufacturers use symbologies that are readily deciphered by  
15 commonly used scanning equipment to code for the National Drug Code (NDC), lot number, and  
16 expiration date on all unit dose, unit-of-use, and injectable drug packaging. ASHP urges for a  
17 universal standardization of NDCs, which are currently represented in a 10-, 11-, or even 12-digit  
18 formats. Pharmaceutical manufacturers should also provide all medications used in health  
19 systems in unit dose packages. The FDA, pharmaceutical manufacturers and packagers, and  
20 BCMA system manufacturers should collaborate to minimize or eliminate causes of false  
21 rejection of valid medication doses. Certain characteristics of the current NDC identification

22 system contribute to the burden of implementing BCMA systems, and ASHP urges stakeholders  
23 to participate in efforts to develop a system that more reliably identifies the unique drug (or  
24 combination of drugs), strength, dosage form, and route of administration.

25         Although bar-coding systems are currently a widely used point-of-care technology, ASHP  
26 recognizes that other types of machine-readable coding (e.g., radio-frequency identification)  
27 may evolve. ASHP supports the use of new technologies that are as effective or improve upon  
28 existing systems and believes the principles outlined in this statement apply to such systems.  
29 ASHP encourages further research on such systems to determine how much BCMA systems  
30 reduce preventable medication errors and provide a financial return on investment for hospitals  
31 and health systems.

32

### 33 **Background**

34 Since the 1980s, health care practitioners and policymakers have recognized the potential  
35 benefits of using bar-coding technology in the medication dispensing and administration  
36 process.<sup>1-5</sup> Although there is a consensus of expert opinion supporting advancement of BCMA  
37 technology, more studies are needed to determine the impact of BCMA systems on medication  
38 errors and the finances of health systems. The cost of implementing BCMA is burdensome,  
39 potentially costing \$20,000 to 40,000 per BCMA-enabled bed over five years. However, this cost  
40 can be offset by the potential average savings of \$3,250 per harmful error prevented.<sup>6</sup> BCMA  
41 technology may help reduce hospital medication errors, particularly those related to dosing,  
42 medication selection, administration route, and wrong patient.<sup>7-8</sup> Hospital quality evaluation  
43 systems, such as Leapfrog, have identified BCMA standards, yet regulatory agencies, (such as

44 CMS, TJC, DMV, etc) have not followed suit. ASHP believes that optimally implemented BCMA  
45 systems have tremendous potential to improve patient safety. In addition, reengineering the  
46 medication-use process to implement a BCMA system can provide performance improvement  
47 opportunities in patient care and clinical documentation.

48 Hospitals are scaling up their use of BCMA. In 2020, an ASHP survey estimated that  
49 87.5% of hospitals regularly reviewed BCMA data and quality metrics by a medication  
50 safety/quality committee.<sup>9</sup> Surveys from other groups, such as the Leapfrog Group, have  
51 confirmed >90% of reporting hospitals have implemented BCMA systems in at least one  
52 inpatient unit. However, they note that not all aspects of BCMA are deployed effectively. For  
53 example, 42% of hospitals with BCMA failed to scan both the patient and the medication at  
54 least 95% of the time.<sup>10</sup> The rapid adoption of BCMA systems, along with demand for quality  
55 metrics and safety improvements these systems can provide, present challenges to health  
56 systems. ASHP believes that pharmacists play a vital role in responding to those challenges and  
57 ensuring these systems are used to their full safety potential.

58

### 59 **Role of the Pharmacist**

60 Pharmacists must take a central leadership role to ensure BCMA systems are implemented  
61 across the spectrum of care and designed to reliably improve patient safety. Poor system design  
62 and inadequate planning can compromise the effectiveness of a BCMA system and may  
63 introduce new sources of errors into the medication-use process.<sup>9</sup> Growing experience with  
64 BCMA systems has produced a body of knowledge that will aid hospitals and health systems in  
65 the adoption and maintenance of BCMA systems.<sup>11-15</sup>

66 Implementation of a BCMA system must be accompanied by the development of policies  
67 and procedures that ensure the system's safety. These policies and procedures should be  
68 developed by an interdisciplinary team, including pharmacists, to ensure the documentation  
69 incorporates diverse perspectives and expertise for successful adoption.<sup>13-14</sup> Pharmacists and  
70 nurses should be involved with post-installation evaluation and system improvement initiatives.

71 Monitoring of a BCMA system is critical to ensure adherence to policies and procedures  
72 and to close gaps in the medication use process. Organizations should create a routine process  
73 to audit BCMA compliance to identify caregiver and medication outliers. Additionally,  
74 organizations should establish clear guidance on criteria for continued administration of the  
75 medication in the event of a BCMA failure, outlining procedures for safe administration.  
76 Furthermore, a mechanism for reporting BCMA failures must be established to facilitate timely  
77 resolution for when the BCMA system is not functioning properly.

78 The role of nurses as end users of this technology is essential to successful system  
79 implementation and use. Processes for delivery and storage of medications (e.g., in medicine  
80 rooms or bedside storage spaces) should be examined by pharmacists and nurses to avoid  
81 workarounds or diversion.

82

### 83 **Elements of a BCMA System**

84 While each hospital and healthcare system will need to tailor a BCMA system to its own needs,  
85 the following principles should guide the implementation and use of such systems.

86 BCMA should be implemented across all areas of the health system, including outpatient and  
87 procedural settings, where adoption has historically lagged behind inpatient units, ensuring that

88 each patient, healthcare provider, and medication receives a unique identifier. This identifier  
89 should be used not only to verify care prescribed for a patient but also to document every  
90 significant step in the medication-use process.

91 Efficiency and security in patient identification are paramount. A well-defined process  
92 should be in place for attaching and replacing patient identification tags, discouraging the  
93 printing of multiple labels, and maintaining a single active wristband per patient.<sup>15</sup> In addition to  
94 appropriate human-readable information, machine-readable patient wristbands should contain  
95 information (e.g., a photograph or the patient’s medical record number) to uniquely identify the  
96 patient.

97 User identification within the BCMA system should be secure and unique for each  
98 healthcare provider. The care provider administering medication should be able to use the  
99 BCMA system to verify that the medication is appropriate for the patient (i.e., confirming that  
100 the “five rights” of medication administration are met).<sup>16</sup> The BCMA system should document  
101 the information in the electronic medication administration record.

102 The pharmacy plays a pivotal role in BCMA implementation. The pharmacy must ensure  
103 that doses delivered to patient care areas can be scanned without inappropriate rejections and  
104 that those scans reliably indicate whether the medication is appropriate for a particular patient.  
105 The health system must commit the pharmacy resources necessary to verify that each incoming  
106 medication is scannable, and that the data encoded within its bar code accurately represents  
107 the product.

108 Each medication should be packaged in unit doses and should be labeled with both  
109 human-readable medication identification information and a machine-readable code that

110 includes the medication's unique identifier (e.g., NDC) and, when feasible, its lot number and  
111 expiration date, aligning with ASHP's advocacy for enhanced barcode standards. Pharmacy  
112 information systems must be able to generate bar codes for multiple-component items.  
113 Pharmacy departments must develop a validation process for ensuring that every item has a  
114 scannable bar code compatible with all equipment supporting the BCMA system, including  
115 pharmacy automation systems, automated medication storage and distribution devices, and  
116 nursing BCMA scanning units.

117           An adequate number of scanners should be provided for each patient care area to  
118 facilitate scanning at peak times. Scanners should be capable of automatically recognizing the  
119 various symbologies encountered on pharmaceutical and pharmacy-prepared containers.

120           Finally, contingency plans should exist to ensure patient safety during BCMA system  
121 downtime. These policies should require that medications administered during downtime are  
122 retrospectively documented electronically in the medical record so that decision-support  
123 systems accurately reflect clinical trends related to the patient's condition, medication  
124 administration, and side effects.

125

## 126 **Conclusion**

127           ASHP encourages health systems to adopt BCMA technology, with the goal of  
128 electronically verifying all medications before they are administered. Pharmacists must  
129 ultimately be responsible for developing and maintaining the infrastructure necessary to ensure  
130 BCMA success, and health systems deploying BCMA systems must provide the funding and  
131 staffing necessary to permit pharmacists to fulfill this role.

132 ASHP believes that pharmaceutical manufacturers should be required to place machine-  
133 readable coding that includes the NDC, lot number, and expiration date on all unit dose, unit-of-  
134 use, and injectable drug packaging, using symbologies that are readily deciphered by commonly  
135 used scanning equipment. ASHP also encourages further research that will determine the extent  
136 to which BCMA systems reduce preventable medication errors or provide a financial return on  
137 investment for health systems.

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188 **Disclosures**

189 To follow

190 **References**

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