

National Bar Code Resource Office
Med Cart
Guidance and Recommendations



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REVISIONS

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Purpose and Objectives

Purpose

To provide VHA facilities with guidance concerning the types of medication carts suitable to various characteristics of the care environment such as nursing care models, care areas, architectural, and environmental considerations.

Objectives

To list medication cart vendors in relation to cart configurations suitable to different models of care and medication delivery, and present a catalog of technical characteristics of medication carts available on the market.

Overview

This document used in conjunction with the Medication Cart Tech Criteria documents will provide those researching the purchase of medication carts an effective tool in aligning the facilities needs with medication carts best designed to meet those needs.

The contents of the document are divided into the following sections:

- Acknowledgements
- Fundamental Assumption
- Three Major Categories of Med Carts
- General Considerations
- Specific factors for matching cart characteristics to the care environment and business practice model
- Medley of Approaches
- Approaches to Avoid Next Time You Buy
- Appendix: Nursing assignment models

Summary

Medication carts are available in a variety of configurations and sizes. These include:

- large medication carts that have many drawers to support medication passes to numerous patients;
- medium medication carts that have fewer drawers and support medication passes to a few patients;
- and
- portable carts that support a single patient medication pass, PRN, One-Time, or single IV administrations.

Medication administration workflow may call for the administration of a single medication to a single patient. Equally, the nursing assignment model utilized may be primary care where one nurse is responsible for the total care of 4 or 5 patients, or the team approach, where there is a nurse that passes medications to all patients. Feedback from BCMA end users has identified the need for a variety of BCMA medication carts. The nature of medication administration patterns and processes can create barriers to BCMA bedside point-of-care and contribute to system circumvention when large medication administration carts are the sole solution employed by the facility. Matching the medication cart to the administration task will improve the use of BCMA as a point-of-care software solution.

A diverse selection of medication cart configurations will support nursing workflow, compatibility between task demands and physical demands on users in relation to the medication cart, and bedside point-of-care medication administration. Factors to consider include:

- Physical layout of the nursing unit (door jamb width, clearance around patient beds);
- Ability to position cart to still see the patient, type of floor surface (tile, carpet);
- Nursing assignment model used on the unit (Primary, Team, Modular);
- Variety and type of administrations employed within the ward location; and
- Patient groupings (Medical, Surgical, Acute Care, Intensive Care, Mental Health, and Long Term Care).

Criteria Development

Collaborating with VHA medical center staff, the BCMA Infrastructure Optimization Medication Cart workgroup included field representatives from bio-medical engineering, information technology, nursing, and pharmacy. The workgroup identified current issues with medication carts and medication storage devices that hinder the optimal use of BCMA. The workgroup integrated field inputs with their own experience and knowledge to identify factors that promote optimal use of BCMA. Through market research of the variety of medication carts and facility custom devices, the workgroup assessed and identified medication carts and devices that would best meet the variety of needs identified by the end users.

Fundamental Assumption – End user evaluation of Med carts in the actual environment of use

- A major assumption of this document is that, as we move forward, all facilities will evaluate prospective carts on the actual ward areas where they will be used.
- This tactic is the only way to assure that you have assessed key features of cart usability.
- Remember to include all stakeholders in the cart's characteristics: Nursing, Pharmacy, IRM, Biomedical Engineering, Environmental Management Services, etc.
- Simulate your complete med pass with a walkthrough using the cart loaded as it is during the med pass (don't forget the power supply, computer, scanner, straws, cups, juice and applesauce!).
- Use as many actual supplies and medications as possible when testing out the cart, including filling the drawers, medications, sharps containers and storage bins. Be creative and use sample items that conform to the size, shape and weight of what gets put on the cart work surface, too.
- Key features include ease of pushing and steering the cart with its handle(s) through patient rooms, the nursing station, medication rooms, and the locations where the carts will be parked between med passes. Validate that the cart you are considering is easily maneuverable by various staff with differing physical characteristics in the prospective care environment.
- Include steps such as plugging it in at its "resting" location between med passes, filling the cart, and various staff taking it to any areas where the caregiver takes it to pick up medications or other supplies, into all patient rooms on the ward, dining rooms, etc.
- For pharmacy tasks, again, use actual supplies as possible to simulate cart exchange activities to determine its ease of use.
- For IRM, explore removal of the battery and access to other cart components that require repair and maintenance.

- Simulate cleaning all the components of the cart per the General Considerations below.
- Use the Medication Cart evaluation documents on the Bar Code Resource Office website to guide and standardize your evaluation of the med carts.

Three Major Categories of Med Carts

In this document, reference to the range of solutions that are being used to bring patient, nurse, scanner, and BCMA software to the bedside will be made through use of the general term, “med carts”. Below we carve out definitions for three main categories of med carts that form the framework for the types of solutions that are available from the commercial sector for med carts. Towards the end of the document we also include examples of “single room” approaches.

Medication administration workflow may call for the administration of a single medication to a single patient. Equally, the nursing assignment model utilized may be primary care where one nurse is responsible for the total care of 4 or 5 patients, or the team approach, where there is a nurse that passes medications to all or a group of patients. BCMA end users have identified the need for a variety of BCMA med carts. The nature of medication administration patterns and processes can create barriers to BCMA bedside point-of-care and contribute to system circumvention when large med carts are the sole solution employed by the facility. Matching the med carts to the administration task will improve the use of BCMA as a point-of-care software solution.

Our three main categories for med cart configurations and sizes are:

1. Medication Carts: carts that have many drawers for administering medications to numerous patients.
2. Point-of-care (POC) carts with med drawers: medium medication carts that have fewer drawers and support administering medications to a three to eight patients.
3. Computers on wheels (COW): portable carts that support a single patient medication pass, PRN, One-Time, or single IV administrations.

General Considerations

- * Start your market research of cart options a minimum of 4 months prior to submitting a Request for Proposal (RFP) to allow for scheduling of vendor visits with products, site testing of products, and analysis of user experience findings.
- * Consider one med cart for each nurse responsible for administering medications on a med pass.
- * Train staff in the proper use of handles and pivoting/non-pivoting wheels to increase ease of pushing and maneuvering the cart. Follow the manufacturer guidance if it is available.
- * For some wards it can be helpful to create a central medication exchange area on the ward. This area would support pharmacy medication exchange and streamline collection of patient medications between pharmacy exchanged items, Automated Distribution (AD) items (e.g., Pyxis, Omnicell, Accudose, etc.), and ward stock items.
- * Facilities must establish, through their local BCMA multidisciplinary committee or the equivalent, accountability for med cart repairs, maintenance and cleaning. Consider inviting Environmental Management/Housekeeping to the table to be a player in these roles and responsibilities.
- * Leadership support for this collaboration needs to be demonstrated tangibly through a memo to formalize these responsibilities.

- * Follow manufacturer’s recommendations for cleaning and maintenance.
- * In addition, the facility BCMA multidisciplinary committee or its equivalent should create a checklist for regularly scheduled cart cleaning and maintenance that align with the roles and responsibilities formalized by leadership.

Example items for cleaning include (but are not limited to):

- Remove items that have fallen behind and between drawers to free up the auto-locking mechanisms [(if applicable to your cart’s design)].
- Clean screen/housing over the cooling fan (on med cart or computer or both).
- Clean wheels to improve their efficiency and locking devices.
- Clean out medication and storage drawers.
- Clean the computer screen and the keyboard. Consider sealed, waterproof keyboards and/or keyboard sheaths. Test the potential keyboards with users to assess ease and accuracy of typing with these “membrane-sealed” designs.
- Empty and clean the trash bin and other bins for holding items such as pitcher holders, etc. If there are protective layers beneath the trash bin to protect onboard electrical systems, assure they are in place.
- Clean the work surface.
- Dispose of sharps containers when at designated filling levels.

Example items for maintenance include (but are not limited to):

- Verify that all the drawers on the cart lock correctly.
- Verify that wheels lock and unlock properly.
- Verify that the height adjustment mechanism is functioning correctly.
- Check the integrity of electrical connections between equipment.
- Check for wear and tear on electrical cords and cables.
- Check handles and any external arms to ensure they remain secure and stable in the fixed position.
- If you have an external arm, be sure the pivot joints are snug and maintain their selected positions.
- Inspect the battery to ensure that it is securely connected to the cart.
- Verify that the battery is able to hold a full charge.
- Inspect locking mechanism parts for wear and tear.

- * Auto-locking Mechanisms for med drawers/cassettes -- Some of the mechanisms for auto-locking of med drawers are prone to jamming and failure. Explicitly discuss with prospective vendors how they provide preventive part replacement and maintenance to decrease the likelihood of drawer jams. Discuss with vendors any modifications that can prevent items from falling behind drawers

and cassettes. ANYTIME you encounter a major drawer jam with your cart, please relay that information to Jonathan Bagby (jonathan.bagby@va.gov) of the Bar Code Resource Office.

- * Keys to override the locking mechanism need to be accessible on all shifts (if applicable to your cart design).
- * Facilities should acquire spare med carts to minimize disruption in the medication administration process when repair needs arise. The number of spare vehicles should be proportionate to the size of the fleet of med carts.
- * Acquire critical spare parts to store onsite, to decrease repair time. Examples include batteries, cords, keyboards, keyboard protective sheaths, drawers and mechanical parts for system locking mechanisms.
- * When remodeling or renovating wards consider relocating and adding additional power outlets in locations that optimize workflow and decrease musculoskeletal stress. For example, try to cut down on the distances caregivers travel to retrieve equipment for the med pass and store it at the end of the med pass. Also, adjust the height of the power outlets to reduce bending. Consider increasing number of electrical outlets for power sources should carts and IT devices both require recharging.
- * Engage a team with representatives from Nursing, Pharmacy, IRM, and Biomedical Engineering, and others as appropriate (i.e., Environmental Management) when initiating a med cart purchase to ensure the needs of the facility are completely meet.
- * Also, when initiating a med cart purchase decision, contact the Bar Code Resource Office staff to learn about new developments and potential points-of-contact regarding the med carts.
- * To address cart maneuverability of your present or prospective med carts, note the following elements:
 - Be certain that you know the size of doorway clearances, clearances around furniture in the range of patient room types, nursing stations, hallways, medication rooms, and anticipated storage areas. This directly determines what footprint dimensions constrain your choice of vendor offerings. Be sure to evaluate the med cart's performance with different floor coverings. Do not purchase med carts without taking them through their paces on the wards in which med carts will be used to verify their size and maneuverability.
 - Wheels -- size and number: Increasing the wheel size can improve ease of pushing and maneuvering the cart. Double wheels on each corner can also improve this element. Investigate available options with the vendor.
 - Wheels -- pivoting and locking: Learn from the manufacturer the optimal combination of pivoting and locking wheels to yield the best maneuverability. Locking wheels can also help stabilize a cart and help steady it if a patient grabs at the cart to keep their balance. Train staff in the proper use of wheel locking to optimize med cart maneuverability.
 - Handles and their positioning -- All med carts must have handles with space for gripping. Assess if you should opt for more than one handle when offered by a vendor. Train staff in proper use of handles to improve maneuverability and reduce musculoskeletal strain.
 - Computer mounting -- location: The location of the computer monitor arm/mounting can extend the overall length/width/height of the cart. This creates a larger footprint and requires more space to maneuver into rooms and around furniture. Extended height

increases the probability that the user may not be able to see well around the med cart and increases the potential for spillage of items kept on top of med carts.

- Computer mounting -- weight of unit: Numerous facilities have encountered designs where the computer supported on the arm weighs so much that the arm cannot be adjusted in height and actually sits on top of the work surface. Avoid this approach (see pictures in “Approaches to Avoid Next Time You Buy” below).
 - Battery location -- When assessing med carts for purchase, note if the battery position creates an imbalance in how the cart steers. Also note if users are prone to run into the battery with their feet when they use the med cart, thus affecting the distance they must maintain from the cart as they are working. You should also consider the location of cart batteries for ease in access during scheduled maintenance.
- * Computer mounting -- ventilation: Laptops and computers that cannot be properly ventilated suffer frequent hard drive failures. Examine the prospective med cart and computer design to ensure laptops or CPU housings include space for adequate ventilation. In the case of laptops, the use of additional vent or fan pads beneath the equipment may prove beneficial.
- * Keyboard -- Avoid designs for keyboard storage that use a laptop shelf or other mounting over the work surface area where the angle and height of the keyboard is not located in a favorable orientation to the user’s wrist and arm heights. Again, when choosing med cart configurations, be certain to assess these factors in the actual environment of care with staff of differing builds and modify your choice as needed. Keyboards that are stored in stationery, conventional drawers do not allow height or angle adjustment and also block access to the medication drawers located beneath them. Also, check keyboards mounted on arms, both on carts and for wall-mounted units, to ensure the arm is rugged enough so that the keyboard does not bounce when the nurses type on it.
- * Keyless Cart Entry -- Inquire how users IDs/PINs are maintained. It is preferable to be able to access these items via software centrally, as opposed to having to reprogram each individual cart with this information. The facility will need to have a plan in place to maintain staff codes when turnover occurs. Often, manufacturers provide a “master” code to assist with set-up, testing, and training of new carts. However, issuing this master code to all staff can lead to security breaches if staff turnover occurs. Consider disabling the master code on all carts after rollout and creating a code system that reduces the risk of security breaches such as compartmentalizing codes (e.g. assigning a different code for each ward). Ask the vendor about cart entry auditing options.
- * Scanner options -- some facilities find benefit in equipping the carts with both wireless and a stationery scanner. The stationery scanner provides an alternative way to scan medications. Newer “presentation” style scanners only activate the scanning beam when an item is passed under them, in contrast to earlier models that always had the beam on. When mounting a scanner for stationary use, ensure the scanner is mounted so that the user can see the target area to be scanned (in most cases the beam will be pointing away from the user). This will help the user to better align the beam with the item to be scanned.
- * Optional upgrades -- Work with the vendor to get a sample of an upgraded feature to evaluate before you finalize your purchase. For example, if an option such as a heavy duty computer arm seems appealing, get the arm onsite and take the arm up to the wards and take it through the workflow. Your colleagues have been unpleasantly surprised by the size and weight of some optional items.

- * Lighting -- Consider a light or backlit keyboard to assist nurses on evening and night shift med passes. The tradeoff here is that some facilities have had trouble with lights being damaged on their carts. Clarify with the vendor the amount of battery draw from the lighting source.
- * Touch screen computers -- Facilities have reported that touch screen computers are prone to failure as the screens wear out in regions that are frequently touched, i.e., the upper right corner used to close software windows. Also, they require occasional recalibration of the screens. Sites have also reported that they use large quantities of power off the cart electrical supply.
- * Fully integrated systems (scanner/computer/electrical supply/wireless communications) versus facility configured systems (facility/VISN determine what type of individual components) -- These choices should be assessed in terms of current/future facility environmental factors such as availability of thin/thick client/laptop approach, ease of repair, ease of replacement/upgrade, technical support, local facility knowledge/skill bases/resources, and service contracts.
- * Multiple vendor configurations -- It is common to have a separate manufacturer for the med cart base and another for the electrical and computer components. Additionally, the scanner manufacturer is independent. Clarify that a specific vendor assumes responsibility for specific components of the cart, and incorporate this understanding into the purchase agreement language.
- * Vendor tested configurations -- Departing from a vendor-tested configuration can influence performance outcomes and thus deliver results not in line with pre-purchase expectations.
- * Battery solutions -- Examine the battery options available to you, for example, does the battery develops a charge memory, is it nickel cadmium (NiCad), nickel metal hydride (NiMH), etc.? Be sure to clarify the pros and cons of the battery options available for a prospective med cart. Compare the projected battery life with your actual needs by doing the math on your usage needs. This analysis will help you understand what battery will be a good fit for your needs.
- * Electrical supply on the cart -- Ensure the cart provides at least four power outlets.
- * Patient and staff electrical safety -- UL 60601-1 is an electrical standard that lowers the risk of patient and staff electrical shock. Ask vendors what components of the cart are UL 60601-1 compliant, as the goal is to get a fully compliant system – electrical supply and computer.
- * Service agreements -- Med carts are complex equipment, often involving the participation of more than one vendor to provide the final product (Base cart, scanner, computer, integrator, etc.). Purchase a service agreement/maintenance contract with the vendor(s) to cover service and maintenance not covered under warranty. Also consider extending this beyond the warranty period. Clarify with the vendor(s) what is covered specifically under the warranty to determine when the period of any other service agreements should commence. Use the contract to define roles and responsibilities for all cart component repairs, replacement and maintenance. Clarify if parts can be shipped to you before you ship out the defective component. Clarify service and emergency repair availability.
- * Staff Training -- Clarify what type of training the vendor will provide during implementation. Discuss specifically the types of help information available to place on the cart and also whether they provide video training modules that can be provided on your facility website for staff to access as needed. Request training on the proper use of handles and locking wheels to maximize on ease of maneuvering the cart. Encourage vendor participation in training on all tours of duty.
- * Ward Design and Layout -- Validate that the med cart you are considering is easily maneuverable in the prospective care environment. Simulate your complete med pass with a walkthrough using the

cart loaded to the weight it carries during the med pass (don't forget the power supply, computer, scanner, straws, cups, juice and applesauce!). Include steps such as plugging it in at its "resting" location between med passes, taking it to any areas where the caregiver takes it to pick up medications or other supplies, into all patient rooms on the ward, etc. (These statements are also made in the Primary Assumptions).

- * Consider having your local Safety Department do a "Push/Pull" test on the fully loaded cart. This provides an objective measure of the amount of force in pounds required to move the med cart in terms of pushing or pulling. When you have done your measurement of the force required, send that information to Jonathan Bagby (jonathan.bagby@va.gov) of the Bar Code Resource Office to see where it falls within the Human Factors material handling ergonomic tables. If different floorings are used (carpet, tile etc) in your care settings with BCMA, make sure to measure there also. This information is also valuable when managing light duty staff assignments.
- * Single patient or as-needed administrations -- To reduce the need to move a large piece of equipment frequently, consider including POC carts or COWs in your fleet of medication carts to support delivery of single patient administrations such as for Isolation patients, PRNs, IVs, One-time administrations, etc.
- * Keeping wireless scanners with their correct base unit/med cart -- To keep the correct pairing of your wireless scanner and the base unit/med cart it belongs to, simply label those components as a set, such as base unit #1 & scanner #1, base unit #2 & scanner #2, etc.
- * Cart Exchange – Be mindful of pharmacy cart/cassette exchange needs. Smaller POC carts will mean more stops for the pharmacy while on the floor. The facility will need to have a plan in place to ensure drawers are returned to the correct carts and carts are accessible during the cart exchange. Also, some medication cart vendors have designed their POC and medication cart drawers to be interchangeable, but not all! If the two types are not interchangeable, this may pose a problem for the pharmacy staff as they will not know which type of drawer to use during a cart fill.

Specific factors for matching cart characteristics to the care environment and business practice model

To maximize usability, it is essential to assess the number of drawers, amount of storage, and work surface in relation to the following three factors: Nursing assignment model, care setting, and drug delivery model. These elements influence how large the med cart needs to be to efficiently accomplish a med pass and efficiently deliver medications from the Pharmacy.

1. **Nursing Assignment Models:** Table 1 sets out the recommendations for the type of cart for the nursing assignment model that is employed in a given ward.

Table 1: Cart Recommendations per Nursing Model

IF the Nursing Model is:	THEN Consider:
Primary	POC carts with med drawers
Team	Medication Carts with COWs for one-time, PRN and IV meds
Modular	POC carts with med drawers and COWs for one-time, PRN and IV meds

2. **Care Setting:** Table 2 relates four main care settings to the type of cart recommended to serve in such areas.

Table 2: Cart Recommendations per Care Area

IF the Care Setting is:	THEN Consider:
ICU	POC carts with med drawers, POC Carts OR Wall Mounted Laptop/Scanners
Acute Med/Surg	POC carts with med drawers or smaller Med Carts and COWs
Acute Mental Health	Medium-sized Medication Carts
Long Term Care	Medium-sized Medication Carts

3. **Drug Delivery models:** Table 3 shows cart recommendations based on drug delivery practices in the facility.

Table 3: Cart Recommendations per Drug Delivery Practice

IF the Drug Delivery Practice is:	THEN Consider:
Central Drug Storage: Automatic Distribution (AD) (i.e., Pyxis, Omnicell, Accudose, etc.); Ward Stock	POC carts with med drawers, COWs
Pharmacy Exchange Cart	POC carts with med drawers or smaller Medication Carts. Consider using a centralized cart for pharmacy delivery coupled with a POC cart with drawers to deliver medications to multiple patients during a medication pass.
Combination Central Drug Storage	Consider using a centralized cart for pharmacy delivery. Use

and Pharmacy Cart Exchange	POC carts with med drawers for the nurse to add the medications from the other drug storage locations on the ward to collect all patient meds prior to the medication pass.
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Medley of Approaches

In this section photos illustrate a range of approaches to storing medications and scanning at the bedside. These alternatives could be a useful solution to your facility's specific needs and capacity.

Wall-mounted computer and scanner



Note that the keyboard needs to be supported with an arm of its own. If it doesn't have that support, it bounces when the staff type.

POC cart with vitals monitor on it



Custom-built med cabinet



Another Custom Cabinet



ICU Wall-Mounted Computer



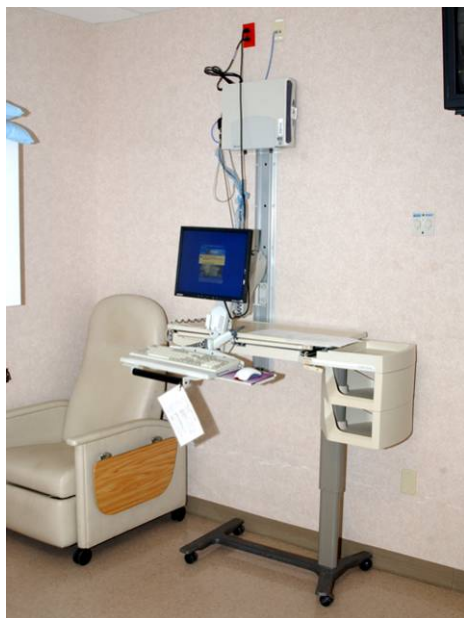
Same ICU – “Breadbox” med drawer storage option near Automated Dispenser. “Breadbox” detail below.



Med Cabinet in Single Room



ICU set up with in room wall mount and medium size cart used in hall as centralized med drawer storage on the unit. Wall mount, plugged into emergency power outlet – Good!



A POC cart with med drawers – good height adjustment for the laptop



Approaches to Avoid Next Time You Buy

This keyboard angle is not healthy. Also, it takes up too much room from the work surface.



Another variation of these shelf mounted laptops, with some “just in time” user guidance -- “Do not fold the clamshell” with IRM phone number included:



CPUs that are installed right behind the monitor make it difficult to adjust the monitor to a good height for viewing by staff.



Appendix A: Carts from Vendors, classified by Cart Category

The following table is a summary of the models sent to the Program Office in response to a request for technical characteristics of solutions for medication administration. To see the complete technical characteristics for a given vendor, visit the Bar Code Resource Office Website.

When checking out the prospective cart offerings, inquire directly with the vendor regarding what types of computer configurations can be accommodated on a specific type of cart. This table shows style of cart and in all cases does not list the full range of alternative configurations due to space constraints.

BCMA cart Category	Vendor	Vendor Website	Model	No. of Storage Drawers	Cart Footprint (D x W)	Cart Work Surface (D x W)
Medication Cart	Artromick	http://www.artromick.com/prod_med_avalo-imc.html	ACSi (Avalo-IMC)	8-24	24" x 26"	16" x 28"
Medication Cart	Artromick	http://www.artromick.com/prod_med_avalo-imc.html	ACMi (Avalo-IMC)	18-35	24" x 38"	16" x 28"
Medication Cart	Howard Medical	http://www.howardcomputers.com/Hospitals-Healthcare.cfm	BCMA Cart (Model 15)	20 - 30	24 " x 26"	15.627" x 18"
Medication Cart	Howard Medical	http://www.howardcomputers.com/Hospitals-Healthcare.cfm	BCMA Cart (Model 45)	20 – 30	24"x 38"	15.6" x 30"
Medication Cart	Infologix	http://www.infologix.com/Healthcare-Solutions/Solutions/Mobile-Carts/page.aspx	Laptop Cart	1-12	17 x 19 1/2	18 x 19
Medication Cart	Lionville Systems, Inc.	Lionville	i800	Nine storage drawers and/or patient drawer cassettes (2 to 27 patient drawers)	22-1/2" x 22"	21" x 22"

BCMA cart Category	Vendor	Vendor Website	Model	No. of Storage Drawers	Cart Footprint (D x W)	Cart Work Surface (D x W)
Medication Cart	Lionville Systems, Inc.	Lionville	i600	Ten storage drawers and/or patient drawer cassettes (2 to 30 patient drawers) plus four additional storage drawers (right front)	24" x 33-1/8"	21" x 31"
Medication Cart	Lionville Systems, Inc.	Lionville	i400	Nineteen storage drawers and/or patient drawer cassettes (2 to 57 patient drawers)	24" x 39-1/8"	21" x 38"
Medication Cart	NA Ware	http://www.naware.com	NLS Med Workstation	10 med bin drawers maximum	17" x 20"	17" x 21"
POC cart	Altus	www.altus-inc.com	EL9P-CLD	1	18"x2 0"	20" x 26"
POC cart	Altus	www.altus-inc.com	HLC7P-CLD	0-4	18"x 20"	20"x 20"
POC cart	Altus	www.altus-inc.com	DC1-CLD	1	18"x 20"	20" x 26"
POC cart	Altus	www.altus-inc.com	DC2-CLD	1	18"x 20"	26"x 20"
POC cart	Artromick	http://www.artromick.com/prod_initi.html	TX10 MedServer (Initi)	2-16	16.3" x 19.5"	13" x 18"
POC cart	Artromick	http://www.artromick.com/prod_tx11.html	TX11 MedServer (Initi)	2-16	16.3" x 19.5"	13" x 18"

BCMA cart Category	Vendor	Vendor Website	Model	No. of Storage Drawers	Cart Footprint (D x W)	Cart Work Surface (D x W)
POC Cart	Artromick	http://www.artromick.com/prod_med_ws-imc.html	NX10 Workstation	0-4	16" x 17"	15.5" x 21"
POC Cart	Artromick	http://www.artromick.com/prod_imc_initi-compact.html	TX20 Workstation	n/a	16.3" x 16.3"	Small: 14" x 15"; Large: 14" x 22"
POC Cart	Carstens	http://www.carstens.com	Walkaroo III - Mobile PC Cart, Cat #6408-00	Up to 1	25" x 24.5"	23.5" x 12.5"
POC Cart	Carstens	http://www.carstens.com	Walkaroo III - Mobile PC Cart, Cat #6409-CH	Up to 1	25" x 24.5"	23.5" x 12.5"
POC Cart	Compucaddy	http://www.compucaddy.com	Cynergy (All-in-one)	Up to (2) 8" x 12" drawers	20" x 20"	17.5" x 20.5"
POC Cart	Compucaddy	http://www.compucaddy.com	Cynergy (Hybrid)	Up to (2) 8" x 12" drawers	20" x 20"	13" x 20.5"
POC Cart	Compucaddy	http://www.compucaddy.com	Omnicenter	Customizable. Can accommodate appx. 8 individual drawers	21" x 21"	20" x 24"
POC Cart	Compucaddy	http://www.compucaddy.com	FRS	1	25" x 25"	18" x 24"
POC Cart	Enovate	www.enovateit.com www.enovateusa.com	Enovate Laptop Cart	2 - 12	16.5" x 17"	17" x 17"

BCMA cart Category	Vendor	Vendor Website	Model	No. of Storage Drawers	Cart Footprint (D x W)	Cart Work Surface (D x W)
POC Cart	Enovate	www.enovateit.com www.enovateusa.com	Enovate LCD Cart	2 - 12	16.5" x 17"	17" x 17"
POC Cart	Flo Healthcare	www.flohealthcare.com	1760	1 – 3 and 5 - 6	17" x 17"	21.5" x 18"
POC Cart	Flo Healthcare	www.flohealthcare.com	1800	1 – 3 and 5 – 6	19" x 21"	21" x 21"
POC Cart	Howard Medical	http://www.howardcomputers.com/Hospitals-Healthcare.cfm	POC Cart	1	17" x 20"	15.625" x 20.688"
POC Cart	Infologix	http://www.infologix.com/Healthcare-Solutions/Solutions/Mobile-Carts/page.aspx	DF-SL-CPU Cart	One 3" drawer OR two 3" drawers OR one 7" drawer	15.41" x 16"	12" x 20"
POC Cart	Infologix	http://www.infologix.com/Healthcare-Solutions/Solutions/Mobile-Carts/page.aspx	UltraLite	Left & Right Side Bins OR One 3" drawer	10.5" x 15"	12" x 18"
POC Cart	Lionville Systems, Inc.	Lionville	iPoint.1	One storage drawers or one patient drawer cassette (2 or 3 drawers per cassette) combined with an accessory drawer.	21-1/2" x 24"	20" x 21"
POC Cart	Lionville Systems, Inc.	Lionville	iPoint.3	One, two, three storage drawers and or patient drawer cassettes (2 to 9 patient drawers) combined with one accessory drawer.	21-1/2" x 24"	20" x 21"

BCMA cart Category	Vendor	Vendor Website	Model	No. of Storage Drawers	Cart Footprint (D x W)	Cart Work Surface (D x W)
POC Cart	NA Ware	www.naware.com	Model: NA WARE - NLS Workstation	One or two standard drawers.	17" x 20"	17" x 21"
POC Cart	Omnicell	http://www.omnicell.com	Rio – Point-of-care workstation	both the documentation and med/storage cart have an option for a 5" storage basket	16" x 16"	12" x 17"
POC Cart	Omnicell	http://www.omnicell.com	Rio – Point-of-care workstation	customizable: 2-8 drawers	16" x 16"	12 x 17"
POC Cart	Rubbermaid	http://www.rubbermaidmedical.com/rubbermaidCommercial/rubbermaidmedical/index.jhtml	Model: Medication Station with 34 Amp AC Power system for Flat Panel Monitor & CPU; Model: Laptop Medication Station with Valence Power system	2 - 12	21" x 27"	12" x 16.375"
POC Cart	Rubbermaid	http://www.rubbermaidmedical.com/rubbermaidCommercial/rubbermaidmedical/index.jhtml	Model: Computing Station for Flat Panel Monitor & CPU; Model: Laptop Computing Station & Valence Power system	1 large drawer that is, can add a wire basket below cart body as well	21" x 27"	12" x 16.375"
POC Cart	Stinger	http://stingerindustries.com/	Fusion	1 to 5	17" x 19"	11.5" x 18"

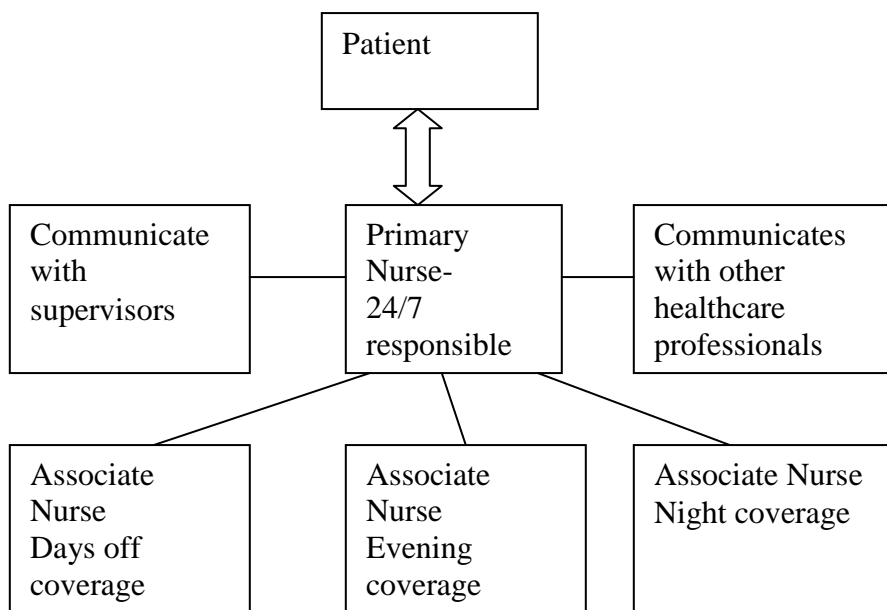
BCMA cart Category	Vendor	Vendor Website	Model	No. of Storage Drawers	Cart Footprint (D x W)	Cart Work Surface (D x W)
POC Cart	Stinger	http://stingerindustries.com/	Levigator	1 to 3	17" x 19"	11.5" x 18"

Appendix B: Nursing assignment models

Nursing assignment models refers to the operational model used for provision of patient care. Although there are six models identified, this section describes the Primary, Team, and Modular nursing models.

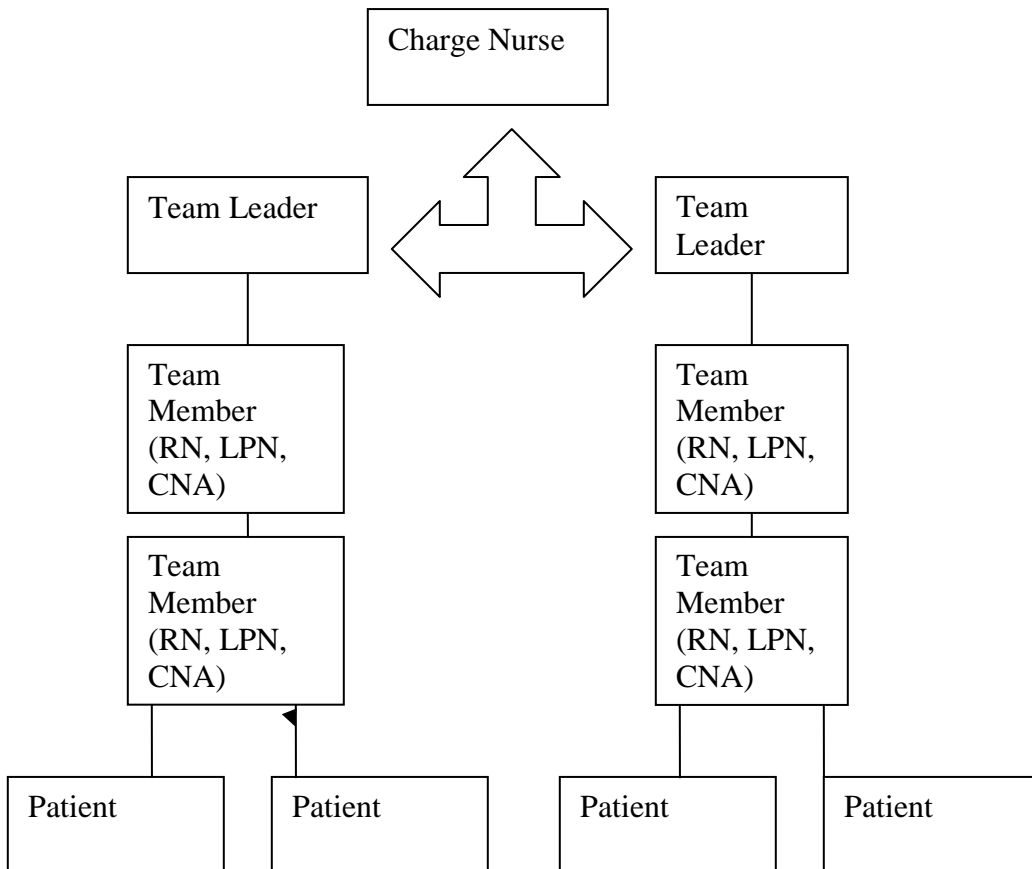
Primary Nursing

- ❖ Is characterized by one RN responsible for the planning, delineation and provision of care to the group of assigned patients 24/7
- ❖ May be responsible for 5-6 patients depending on the patient care setting (in an ICU, the maximum number of patients per nurse is 2 based on the acuity level of the patient)
- ❖ Additional staff known as associates provide care during non-duty hours of the primary nurse



Team Nursing

- ❖ Patient care area is distinguished by teams assigned to groups of patients
- ❖ Is characterized by one charge nurse responsible for the day-to-day operations of the patient care area (may be the one taking off orders, calling providers-varies per area/facility)
- ❖ One team leader assigned per team and is responsible for patients on the team for that tour of duty (may be responsible for communicating with other healthcare providers, take off orders, plan continuum of care with interdisciplinary team members, communicate plan with other staff)
- ❖ Assistive staff (LPN, Certified Nursing Assistant –CNA-or Patient Care Assistant- PCA) assigned to work with the team leader
- ❖ May be responsible for up to 30 patients per team



Modular

- ❖ Defined as below: there is one charge nurse responsible for ensuring all patient care is addressed
- ❖ Patients are grouped according to geographic location
- ❖ Similar to “team” model above, but patient groups are smaller and RN is more involved in direct patient care
- ❖ Staff are assigned tasks or activities to perform, but activities may overlap. For example, the RN and LPN may both administer medications, but each may only give medications to two patients.
- ❖ Allows RN to stay connected with all patients in a module

