

Value-Based Advantages of MOD[®] (Medication On Demand) Oral PCA Technology



Abstract – MOD[®] Oral PCA adoption can lead to multiple value-based advantages. For those wanting to switch from frequent costly IV PCA use to oral PRN medication, the MOD[®] provides the ideal transition from IV PCA, or it can be used immediately post-operatively in those patients who can take oral pain medication. Patients have reported better pain management using the MOD[®] for medication delivery compared to the frequently delayed manual delivery process. MOD[®] use removes the time-consuming nursing manual delivery which both improves pain management and saves nursing time to focus on other essential care tasks. MOD[®] also captures extensive pain data including the numeric pain score at the time of medication delivery and a reassessment numeric pain score. Pain data is available during the patient device use and is saved after discharge. Stored pain databases for all MOD[®] patients can be reviewed and queried to meet Joint Commission standards to compile and analyze pain data for improved management. MOD[®] pain data can also be directly integrated into any Electronic Medical Record.

- **Safer and less expensive than IV PCA**

New recommendations for postoperative pain management and surgical protocols including the ERAS (Enhanced Recovery After Surgery) protocols recommend the use of oral pain medications for pain control.¹ This approach usually includes a combination of scheduled acetaminophen, NSAIDs, and gabapentin or pregabalin along with PRN oral opioids as the regimen of choice for pain. IV PCA is recommended only for those patients who cannot take oral medications. IV PCA use poses the risk of respiratory suppression for some patients that may require naloxone rescue prompting the current recommended expense of capnography with IV PCA. No MOD[®] patients to date have ever needed rescue from respiratory suppression from the use of oral opioids.²

Value – The conservative cost of daily use of IV PCA per patient is estimated at \$124/day (not including the cost of capnography or rescues) compared to \$54 per day for MOD[®] use.³ For example, replacing the use of IV PCA in 40 patients (average length of stay at 3 days) with MOD[®] devices for a month would cost \$6,480 for MOD[®] use compared to \$14,880 for IV PCA. In one year of use, IV PCA use would cost \$178,560 compared to \$77,760 for MOD[®] use, for a savings of \$100,800 with MOD[®] utilization.

- **Higher Patient Satisfaction with Better Pain Management – Better HCAHPS**

Three clinical studies⁴ in oncology and orthopedic surgery have validated that patients using MOD[®] devices had less pain compared to the manual delivery of pain medication by nursing staff. Better pain management and no delay in the delivery of PRN oral pain medication leads to better HCAHPS scores for the hospital regarding overall patient satisfaction and the ability to get help when needed.

Value – Improved HCAHPS scores generate more hospital dollars returned from CMS. Commercial payers are also adopting value-based payments that can be impacted with MOD[®] adoption. Although pain questions have been removed from HCAHPS surveys, other questions related to the use of an oral PCA such as receiving help “as soon as they wanted” and their “room always quiet at night” can improve with MOD[®] adoption. At night, when patients can obtain their PRN pain medication immediately when needed instead of staying awake waiting on the delivery of PRN pain medication, patients say that the MOD[®] device helps them sleep better.

- **Saved Nursing Time Compared to the Manual Delivery of PRN Meds – Less Missed Nursing Care (MNC)**

A nurse timing study comparing the nurse time to administer a single dose of oral PRN pain medication manually as compared to the MOD[®] has been completed at a Florida Magnet hospital and submitted for publication.⁵ The manual delivery time, including pain reassessment time, was 12.7 minutes whereas the [®]nursing time required for a single delivery of oral pain medication was 2.06 minutes including pain reassessment from the device use. Once the device has been programmed and a second eight-dose tray of medication is loaded into the device, only 40 seconds of nursing time is needed for the additional delivery of oral PRN pain medications.

A delay in the manual delivery of oral PRN pain medication has been classed as MNC. MNC has been defined as any aspect of patient care either omitted in part or whole or delayed care now called an error of omission.⁶ MNC is commonly due to inadequate staffing or too many tasks for nursing to complete during their shift time. MNC has been shown to increase patient morbidity and errors in patient care along with increased stress among nursing staff and less job satisfaction. Saving nursing time with the MOD[®] can reduce missed nursing care and improve job satisfaction.

Value – Saved nursing time can be translated into time and money savings, e.g., the nursing time for five patients receiving oral PRN pain medication every four hours compared to five patients using oral PCA devices for PRN oral pain medication every four hours. Five patients receiving manual delivery of PRN medication from a single nurse in a 12-hour shift (5 x 3 doses each = 15 doses) would require $15 \times 12.7 \text{ minutes/dose} = 190.5 \text{ minutes} = 3.2 \text{ hours} \times \$89/\text{hour}$ fully burdened nursing costs⁷ = \$285 in nursing time cost for 3.2 hours of time for a single nurse. In contrast, $15 \text{ doses} \times 2.06 \text{ minutes with MOD}^{\circledR} \text{ use} = 30.9 \text{ minutes of time from 5 nurses} = 0.52 \text{ hours} \times \$89 = \$46$ nursing time cost.

In a postoperative unit with five nurses each with five patients, the total nursing cost of delivery of PRN pain medication per 12-hour shift would be 16 hours of work and \$1,425 cost of nursing time. With MOD[®] use, work time for five patients would be \$230 or 2.6 hours of nursing time. One month of MOD[®] use in that unit would project a cost of \$13,800 for MOD[®] use compared to \$85,500 in nursing time for the manual delivery of PRN oral pain medication.

- **Extensive Pain Data Collection Including Reassessment Pain Scores and Additional Pain Data Query System (PDQS) Modules**

The MOD[®] application “Dashboard”⁸ seen on any hospital-enabled computer screen reveals all patients using oral PCA devices in a unit or facility.

Patient Data During MOD[®] Use⁹ – By selecting any patient’s device symbol, one can access current pain data for that patient during their MOD[®] use as a Shift Change Report showing all the data up until that time of inquiry, including the nurse who programmed the device, medication name, dose and delivery times, pain scores, and reassessment scores. Reassessment pain scores are entered by the patient usually one hour after the self-administered oral pain medication following an audible command from the device to “Enter your pain score now.” It is important to note that medication from the device is always the same dose allowed following a lockout interval in hours. The collection of numeric pain scores is for information/data collection only and does not influence the dose of medication provided from the device.

Patient Detail Report¹⁰ – After the patient is discharged from the device use, the data is retained in a database available to query for a variety of parameters available on the PDQS applications. A patient detail report gives the total picture of the patient use of the device beginning to end and includes all their medication use information and a graph showing all their numeric pain and reassessment scores. The PDQS Reports provide many other options to view previous patient MOD[®] data in collected databases that can be used to meet many Joint Commission Pain Standards compliance reports.¹¹

MOD[®] Utilization Report – This report has two features: (1) utilization of devices by nursing staff and (2) patient pain information detailing a list of selected patients identifying the number of tabs taken, average pain scores, and nursing staff programming the devices. These reports can be transposed into Excel files or other files to query the data for a variety of parameters.

MOD[®] Clinician Report – These reports can be used for any specific patient during their stay to determine the dispense interval in hours during their first 24 hours of device use and the last 24 hours of use. This data is valuable to determine the appropriate opioid prescription if any should be made available at discharge. Since it is known that pain decreases over time, many patients may require only a few opioid tabs or none at discharge depending upon their reduction of pain during their stay.

MOD[®] Pharmacy Report – All devices in use in a facility can be monitored in real time on the dashboard screen in central pharmacy. Specific patient data is available on the same screens as described above. In addition, nurses programming and the second nurse verifying a step is available anytime the medication is exposed during the tray loading process, reloading of a tray, or at discharge. At each of these steps, a second nurse must observe and validate that step. This data can be useful for flagging any suggestion of diversion by staff similar to other commercial pharmacy software programs that provide similar information.

Value – New Joint Commission pain standards for 2018 under Performance Improvement PI.02.01.01 indicates, “The hospital compiles and analyzes (pain) data.” MOD[®] Utilization and PDQS reports can be used for this purpose. No current Electronic Medical Record (EMR) pain data can be extracted directly for multiple patients to query for specific questions regarding pain management.

- **Integration of MOD[®] Data into the EMR**

MOD[®] data can be viewed independently in the MOD[®] databases on the device applications and pain data including reassessment pain scores can also be integrated in real time into the EMR. The Avancen IT team can work with the facility IT team to integrate device data into any current EMR platform.

Value –The EMR integration of MOD[®] pain data saves the nursing time burden for data entry for pain scores and reassessment pain scores into the EMR. Many facilities adopt the device technology and use the data from the MOD[®] platform directly while proceeding to EMR integration of data immediately or at a later date.

Footnotes

1. Chou, R., Gordon, D.B., de Leon-Casasola, O.A., Rosenberg, J.M., Bickler, S., Brennan, T., ... Wu, C.L. (2016). Management of postoperative pain: A clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. *The Journal of Pain*, 17(2), 131-157. doi:10.1016/j.jpain.2015.12.008.
2. To access the White Paper related to this topic, go to www.avancen.com and select the Resources tab on the upper right corner of the screen, scroll down to White Papers and select The MOD[®] Safety Experience After 4000 Patients 2018, or search with: DOI:10.13140/RG.2.2.35754.72643
3. Comparison of the cost/day of MOD[®] per patient versus IV PCA:

Cost	MOD[®]	IV PCA^{***}
Pharmacy drugs	\$3.43	\$19.66
Nursing labor total cost *	\$28.33**	\$55.38
Pharmacy labor	\$7.30	\$13.17
Amortized PCA cost	\$5.24	\$5.24
Error-related costs	None reported to date	\$19.71 error related
Disposables	\$10.13	\$11.22
Total	\$54.43	\$124.38

* Total nursing labor cost for the manual delivery of PRN medication is \$107 per patient/day assuming a PRN dose available every four hours over 24 hours. i.e., six doses.

** MOD[®] can deliver medication more frequently than manual delivery with more administrations allowed but smaller doses in 24 hours, 12 doses maximum compared to six doses given manually with published data showing better pain control.

***Costs do not include capnography or pulse oximetry use. Schechter abstract cites total average cost for two days of IV PCA use as \$285, including costs of complications which added \$187 per IV PCA day.

MOD[®] nursing time data is from a timing study at Flagler Hospital, St. Augustine, FL, with results submitted for publication to Orthopedic Nursing, May 2019. MOD[®] pricing data is derived from value-based contracting data including disposables pricing. Sources for IV PCA data are:

Palmer, P., Ji, X., Stephens, J. (2014). Cost of opioid intravenous patient-controlled analgesia: results from a hospital database analysis and literature assessment. *Clinical Economics and Outcomes Research*, 6, 311-318


Schechter L.N., et al., (2013). Costs associated with intravenous patient-controlled analgesia (IV PCA) in US hospitals, *Value Health*, 16:A117

KPMG Nursing Labor Study, 2017, reporting an average of \$89/hour total nursing time costs. <http://www.natho.org/docs/downloads/KPMG-s-2017-U-S--Hospital-Nursing-Labor-Costs-Study.pdf>

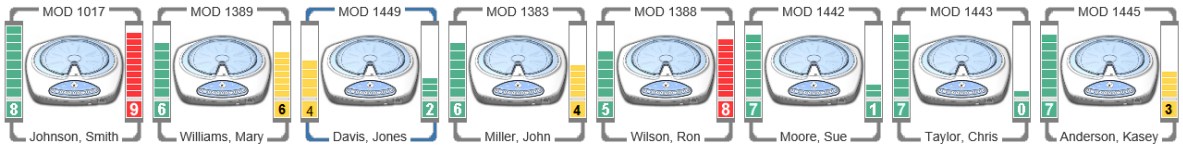
4. To access peer-reviewed published and pending clinical studies, go to www.avancen.com and select the Resources tab on the upper right corner of the screen, scroll down to Clinical Studies and select Avancen Abstracts of Publications in Peer Reviewed Journals.
5. To access peer reviewed published and pending clinical studies go to www.avancen.com and select the Resources tab on the upper right corner of the screen, scroll down to Clinical Studies and select Abstract – A Comparison Timing Study – An Oral PCA Versus Traditional Delivery. This study has been submitted to Orthopaedic Nursing for publication.
6. Kalisch, B.J. (2015). *Errors of omission. How missed nursing care imperils patients.* Silver Spring, Maryland: American Nurses Association.
7. KPMG Nursing Labor Study, 2017, reporting an average of \$89/hour total nursing time costs. <http://www.natho.org/docs/downloads/KPMG-s-2017-U-S--Hospital-Nursing-Labor-Costs-Study.pdf>
8. MOD[®] Dashboard shows all MOD[®] devices in use or idle in any facility or specific patient unit. Each device has a specific serial number that is seen above the device picture; the patient name or ID number is below the picture. The column of numbers to the left of the device from zero to 8 indicates the number of medication tabs in the device at that point in time, the numbers to the right of the device indicate the last pain score entered by the patient with green noting a low pain score, then yellow and red for the highest numeric pain scores up to 10. The dashboard information changes each time the device status changes regarding the pill count and pain scores in real time.

8. Dashboard

Avancen MOD® V3 - Test
User: Clinician1 (Admin)



Actions: Connect Reports Help Details
Display MOD® Devices: Assigned Only All



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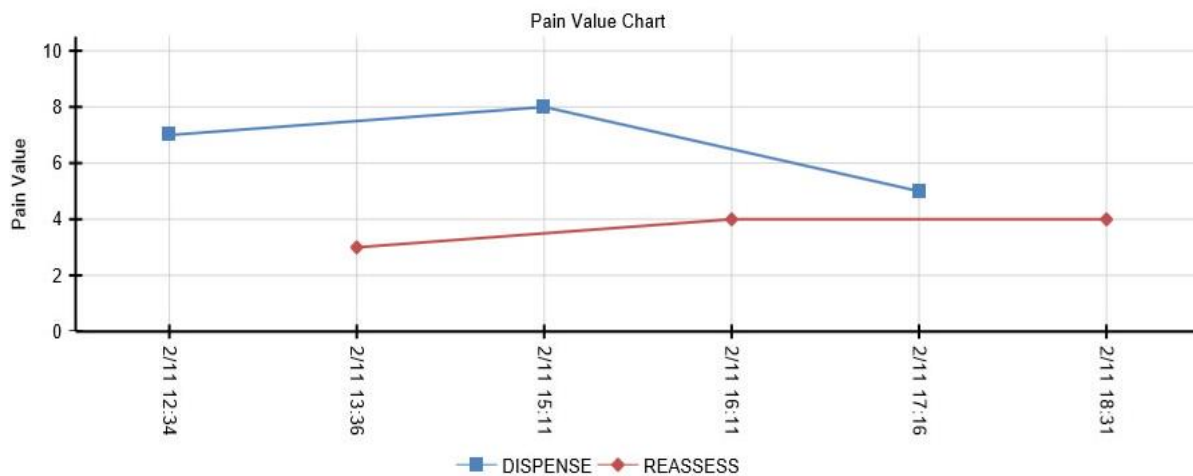
9. Shift Change Report



Shift Change Report (MOD: MOD 1017)

Patient ID: Sample, Patient
Report Run Date: 2/11/2015 6:55:28 PM

Date/Time	Event	Order ID	Drug (Dose)	Dose Start Delay	Dose Interval	Pain Value	Verifier	User Name
2/11/2015 18:31	RE	546890000	Oxycodone (5mg)			4		Sample, Patient
2/11/2015 17:16	DS	546890000	Oxycodone (5mg)			5		Sample, Patient
2/11/2015 16:11	RE	546890000	Oxycodone (5mg)			4		Sample, Patient
2/11/2015 15:11	DS	546890000	Oxycodone (5mg)			8		Sample, Patient
2/11/2015 13:36	RE	546890000	Oxycodone (5mg)			3		Sample, Patient
2/11/2015 12:34	DS	546890000	Oxycodone (5mg)			7		Sample, Patient
2/11/2015 12:32	PR	546890000	Oxycodone (5mg)	2:00	0:00		sc	avancen



10. Patient Detail Report



Patient Detail Report (All MOD® Devices)

Patient Info: Patient, Test3 (F), DOB:2010/08/11, BED:FA049:F016:01

Report Run Date: 10/9/2017 4:11:34 PM

Date/Time	Event	Order ID	Medication	Dose Start Delay	Dose Interval	Pain Value	Verifier	User Name
8/13/2017 10:39	RP	117726	<i>Wasted 0 Pills</i>				Nurse3	Nurse1
8/13/2017 09:32	RE	117726	Reassessment			1		Nurse1
8/13/2017 08:32	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			7		Nurse1
8/12/2017 21:32	RE	117726	Reassessment			1		Nurse1
8/12/2017 20:32	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			7		Nurse1
8/12/2017 10:32	RE	117726	Reassessment			2		Nurse1
8/12/2017 09:32	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			8		Nurse1
8/12/2017 00:32	RE	117726	Reassessment			2		Nurse1
8/11/2017 23:32	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			8		Nurse1
8/11/2017 15:32	RE	117726	Reassessment			1		Nurse1
8/11/2017 14:32	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			7		Nurse1
8/11/2017 07:32	RE	117726	Reassessment			2		Nurse1
8/11/2017 06:32	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			8		Nurse1
8/11/2017 00:32	RE	117726	Reassessment			3		Nurse1
8/10/2017 23:32	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			9		Nurse1
8/10/2017 18:32	DN	117726	<i>OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T</i>					<i>Nurse1</i>
8/10/2017 17:55	RE	117726	Reassessment			3		Nurse1
8/10/2017 16:55	DS	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T			10		Nurse1
8/10/2017 12:55	AP	117726	OxyCODONE--Acetaminophen (5mg-325mg) 5mg/325mg T	0:00	4:00		Nurse3	Nurse1

11. To access a detailed discussion of the PDQS (Pain Data Query System) databases go to www.avancen.com and select the Resources tab on the upper right corner of the screen, and scroll down to White Papers to select the title MOD® Provides the Pain Data Query System (PDQS) – Useful for Joint Commission Pain Standard Compliance Reports.