Centralization and Standardization of Total Parenteral Nutrition (TPN) Ordering and Compounding to Improve Quality and Reduce Cost

Hamilton Health Sciences

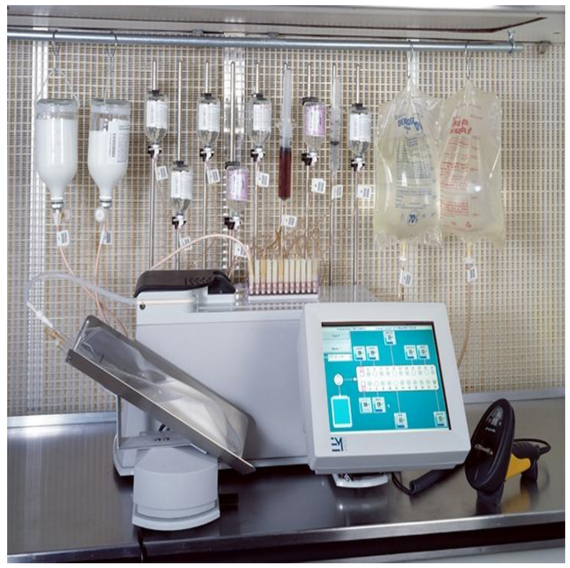
Define → Plan → Do → Study → Act

How do we know a problem or opportunity exists?

Historically at Hamilton Health Sciences (HHS) “total parenteral nutrition” (TPN) was manufactured at two sites (McMaster and Henderson) for patients/clients admitted to any one of HHS’ four sites. Each of the two sites’ pharmacy departments that produced TPN followed a unique process using different equipment leased from different vendors. Expiration of both hardware & software leases in 2009 created an opportunity to optimize quality and cost effectiveness by implementing a centralized and standardized process for ordering and manufacturing TPN through a single HHS site.

What are we trying to accomplish?

Aim: To reduce costs and improve efficiency of TPN production while maintaining or improving service levels, quality of care, patient safety and satisfaction through implementation of a centralized and standardized process for ordering and manufacturing TPN.
Make changes to those processes while ensuring that best practice standards are achieved and/or maintained and efficiency is improved is a formidable undertaking, but also typical of an organization-wide dedication to deriving as much value as possible for HHS patients out of every dollar spent.



How will we know a change is an improvement?

1) 50% decrease in TPN compounder capital purchase costs
2) 50% decrease in ancillary supplies cost (tubing) as% of total TPN manufacturing costs
3) 40% decrease in drug inventory cost as % of total TPN set up costs
4) 50% decrease in % of TPN orders requiring manual additions of drug ingredients
5) 100% decrease in additional TPN purchased at a premium from community-based service provider to supplement HHS production

What changes can we make that will result in improvement?

1) Clinical and clinical support stakeholders across multiple sites were engaged in mapping current processes and describing current practices; 2) Brainstorming sessions generated future state scenarios and process maps based upon the features and capabilities of the new technology; 3) Clinical expertise was utilized to identify and standardize best practices for ordering, compounding and delivery of TPN to HHS patients; 4) Quality improvement (process mapping, data analysis, brainstorming, lean methodology), project and change management methods and tools were applied in the context of the HHS Change and Quality Improvement Model (Define-Plan-Do-Study-Act) - adapted from the Institute for Healthcare Improvement’s Model for Improvement.

Plan

•Future state ordering & compounding processes drafted based on technology/equipment with consideration to population-specific needs of neonatal, pediatric and adult patients
•New compounder tested and confirmed through system demonstration by vendor
•New processes tested and confirmed in technology/equipment to meet service criteria specified by HHS clinical units based on patient’s clinical condition
•Communication & Education plans established for Pharmacists and Pharmacy Technicians to support orientation & training of new TPN compounder features, workflow redesign associated with the new centralized and standardized ordering and compounding process.
•Redesigned staffing model and plan for single site production was established for resource re-allocation. The new practice of centralized multi site order review and entry of TPN orders required hands on training for Pharmacists and Pharmacy Technicians. All staff were trained, tested and certified prior to scheduled go-live dates.

Do

The following milestones and timelines were met as planned:
February 2010 – Added extra production site to MUMC site, eliminated out sourced services
March 2010 – New process introduced to HHS Pharmacy staff involved in TPN order entry
April 2010 – New TPN compounder arrives, MUMC Pharmacy staff training/certification
May 2010 – MUMC site produces TPN for MUMC site, staff training/certification for General site Pharmacy staff
June 2010 – MUMC site adds General site TPN requests, staff training/certification for Juravinski Hospital & Cancer Centre site (JHCC) site Pharmacy staff
July 2010 – MUMC adds JHCC site TPN requests

Study

Outcomes – Efficiency:
• One-time savings of $130,000 with purchase of one TPN compounder
• Ongoing operational cost savings by eliminating out sourced services
• Savings in ancillary & inventory costs for initial daily set TPN equipment
• up Centralization of TPN from two sites to one generated operational cost savings > $200,000/year (annualized). Included: $72,800 of TPN purchased from community service provider, $46,720 in ancillary supplies costs, $91,250 in drug inventory costs.
•**Outcomes – Quality of Care**:
•New TPN technology included “guardrail” measurements
•Barcoding and QA patient safety checks implemented into ordering, compounding and delivery processes to ensure that the “5 rights of medication administration” (person, time, medication, dose, route) are achieved - without exception.
•**Counterbalancing Indicator:**
Newly renegotiated “STAT” delivery fees has resulted in an overall reduction in TPN transportation costs on average $4015 per year

Act

•Review and re-certification of all certified TPN compounding Pharmacy staff will be completed on a yearly basis to ensure strict adherence to best practice.
•Quality, Patient Safety, & Clinical Resource Management supports remain available for consultation and education and the work previously completed (analyses, process maps) will be re-visited to identify opportunities for continued improvements

Lessons Learned

•Internal and external key stakeholder content experts must be represented and engaged to ensure that processes and practices are identified for changes and potential improvements considering a system perspective.
•Define PDSA , Lean tools and change management is required to articulate the case for change and define measurable aims, and structure an evidence-based improvement process.
•Future state should be planned from a systems perspective such that changes to other processes have been considered as scenarios, and don’t trigger unexpected consequences.
•Appropriate internal (HHS) and external (vendor) Information Technology (IT) support and expertise is crucial when learning and implementing new technology hardware and software. Although the initiative successfully achieved all milestones and deliverables, additional IT representation during the “Plan” phase would have led to a better understanding of the hardware and software deliverables and improved planning.

Next Steps:

- Given increasing technology costs and increasing pressures on healthcare providers to maximize value for money, Pharmaceutical Services will continue to respond to these challenges by continual scanning of the relevant industry and clinical literature and peer best practices for further opportunities to leverage the benefits of new technology and process redesign.
- Knowledge transfer across HHS to other centralized, or potentially centralized, services will be achieved through corporate and local improvement forums and through Quality Specialists aligned with local Quality Councils.
- Review and re-certification of all certified TPN compounding Pharmacy staff will be completed on a yearly basis to ensure best practice.

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