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CST Project – NYGH Consultation – Executive Summary

Overview

This executive summary highlights key findings from the week-long consulting visit conducted by NYGH at the CST project offices from October 6 to 10, 2014. A comprehensive review process was undertaken, in which the NYGH team met with executives, directors, managers and other project personnel to gain a broad perspective of current project state.

In the opinion of the consultants, some aspects of the project have been proceeding well; however, important risks to project success were also identified. These risks are organized into four main themes:

1) Project scope and roll-out strategy;
2) Project governance structure and workforce;
3) Clinical content design and clinician engagement;
4) Data governance

The themes define the sections of this report, in which both the identified risks and suggested mitigation strategies are outlined.

Positives of CST Project Current State

- Robust governance structure
- Extensive clinician engagement in design
- Economy of scale – creating design and build for multiple facilities in one project

1. Project Scope and Roll-Out Strategy

Due to the magnitude of organizations, and various system replacements included in scope, Big Bang makes sense as it supports a clean end of one system and start of a new. Attempting a phased approach would be challenging and could not be replicated across organizations, as systems being replaced may differ.

Risk #1:

During our meetings, we had noticed that project scope was not always clearly defined. When considering what to include in scope, determine workflows that could potentially be fragmented or result in lost efficiency if not included. For example, never break apart closed loop medication administration process, CPOE and eMAR must go together.

Suggested Mitigation Strategies:

- Perform an inventory of current processes (automated and manual) and future processes and solutions to be used. This will inform **change management strategies** and aid in the **definition of scope**. Our experience is that it requires more change management effort when moving clinicians from an existing system than moving from paper to electronic.

- Consider excluding physician documentation from scope. CPOE introduces enough change, which should be the primary focus. Often current physician documentation processes are based on dictation, and therefore already accessible to all on line. Our experience shows significant time and resource commitments are required in iterative physician documentation design to maximize workflow efficiencies, capture meaningful and standardized discrete data, and ensure clinician adoption.

- Consider including Bedside Medical Device Interface (BMDI) as it offers significant efficiencies in clinical documentation which in turn supports positive clinician adoption. The effort in setting up this technology is well work the benefits gained.

- Cardiology requires thought out strategy prior to integrating components within this implementation. Some components can be integrated into project scope, but if the plan is to procure a complete Cardiology Information system, then decisions made today may result in rework later.

Risk #2:
With a project of this magnitude and with the complexities of multiple organizations and existing systems, projecting a realistic rollout strategy is a "shot in the dark". For the purposes of project and resource planning, estimated timelines can be developed, however when communicating go live dates to end users, it should be a firm date in order to avoid loss of confidence.

Suggested Mitigation Strategies:

- Your first implementation will set the tone of all future implementation. Make sure it is not rushed. Wait to define your go live date until after clinicians have had an opportunity to "kick the tires" in design validation. This will provide an accurate pulse of effort still remaining and considerations that may have been overlooked.

- There will be many lessons from the first go live that you will need to correct prior to rolling out to subsequent organizations. Allow time in the plan to apply these lessons. We recommend at least 4-6 months (2 months support, 2-4 months to make necessary adjustments). Once you have replicated seamlessly to a new site, only then can you expedite rollout.

- Senior leadership needs to support an "All hands on deck" model minimizing all other competing initiatives.

Risk #3:
Big-Bang go-live requires a well-defined support structure. With all new systems going live at once throughout the organization, all staff will be facing changes and will require support.

Suggested Mitigation Strategies:

- We recommend 4-6 weeks, 24x7 on-site supports. Support should include peer to peer support wherever possible specifically physician “at the elbow” support.

- Need to segregate Clinical Informatics “builders” from front line support so they can manage issue resolution and process urgent change requests. It will be tempting to have them work with front line support since they are often most familiar on how application works, but this will result in delayed issue resolution and potential resource burnout as they are pulled in every direction.

- See detailed report for recommendations regarding setting up Go-Live command centre.

Project Governance Structure and Workforce

Risk #1:
The NYGH team observed that CST project structure has resulted in design and decision-making processes that are siloed. The working groups have overlapping accountability, there is no Cerner system build expertise at the table to guide design decisions. It also appears there is lack of clarity in project deliverables for each group. This approach can lead to three risks: 1) design/build/future state workflow that does not meet all clinical needs (for example, medication build might work well for the pharmacy team that designed it, but is unintuitive for nurses and physicians to use); 2) time is wasted because clinical groups are requesting or suggesting build that is not technically possible within Cerner or not best practice (clinicians would have to wait until their decisions are turned down by builders, then have to meet again to discuss options); and 3) without a central team to co-ordinate design/build decisions coming from different areas, there is a risk of inconsistency of build, duplicate build or missing items that will result in an unintuitive, inefficient and possibly unsafe system design.

Suggested Mitigation Strategies:

- Consider developing a “Core” group that has representatives from all working groups and all disciplines that discuss all design decisions that cross working groups. Have a document management solution that is open and transparent that all working groups can view to see design decisions made and how they could impact their work.
- Develop standards and guidelines for build components. Examples include;
    - set definitions for when order tasks should and should not be used
    - if new orders/nomenclature need to be built, request rationale for deviation from original data set
    - determine standards for order formats so display in orders tab is consistent
    - centralized ESH role to ensure clinical events are not duplicated, nomenclature standards are followed and similar content is grouped appropriately for clinical consumption.

- Recommend CST Provider and Orders Team have more cross-over moving forward.Those with orders build/content knowledge need to help inform the order set design/build group what is and is not possible. When new orders are requested by the Provider team for build into order sets,

they will need to be reviewed by the orders build group before they can be added to the order catalogue. If everyone is at the same table, this dialog will happen appropriately without being "lost in translation" later.

- When reviewing clinical workflows, representation must be at the table from all groups/scopes of practice that the workflow affects. During process redesign, identify suboptimal workflow in current state and correct it in future state (eg med admin FMEA). Consider what is important to patients and staff (e.g. safety, quality, efficiency, patient experience). Consider how this will "mesh" with use of the new system. Each site may have workflow variations, so don't assume that a workflow that has been reviewed at one facility will be exactly the same at another facility.

Risk #2:
The CST project has been successful in communicating that the project is not an IT project, but rather a clinical transformation project as clearly stated in the project name. There are clinical leaders engaged throughout the project committees but what was not clear to us was whether they had clinical operational responsibilities or whether they were clinical leaders put into a specific project role. In order to ensure engagement at the practice level, operational leaders need to be engaged in the system design and implementation.

Suggested Mitigation Strategies:

- Ensure clinical leaders with current accountabilities to direct healthcare delivery are on project leadership committees.
- Clinical Team/Unit Managers have a special role in communicating system benefits to front line staff. Without their buy-in and support, expect a lack of adoption and resistance to change.

Risk #3
The CST project is heavy with consultants driving design and build. The risk is that once project is live, the knowledge of design considerations and build techniques are lost. Those left to support the system are lacking fundamental understanding of design decisions,rationale, and knowledge of system build for maintenance purposes. There is also a risk that decisions will be made for short term success but are not realistic to manage long-term.

Suggested Mitigation Strategies:

- It is very important to build your own internal team of individuals with clinical and technical build knowledge (similar to Clinical Informatics at NYGH). Select individuals from amongst your staff who have a clinical background and an aptitude for informatics. Send them for training from Cerner so that you can create a team that has in-house technical build knowledge. Once trained, these people should be directly involved in meetings with clinicians to make design decisions and validate build. Since these people know what truly is possible and not possible within the constraints of the vendor software, they can help to focus clinician design/validation discussions only on the truly implementable options. If these individuals are not involved in clinician

meetings, the concern is that clinical requirements will be "lost in translation" and the build team will not be able to create a solution that truly meets clinician needs – either because they don't understand what is needed, or because what the clinicians requested simply isn't possible within the vendor software design constraints.

- Rely less on consultants (they don't have a vested interest in decisions, your team won't be able to support after they leave)

Clinical Content Design and Clinician Engagement

Risk #1:
The CST project has been structured so that many different aspects are underway simultaneously: clinical engagement and workflow review, design, build, device selection, development of training materials, and so on. This approach is not recommended, even though it may appear to be more efficient. Significant dependencies exist between these elements which require some of them to be completed sequentially. If instead they are completed simultaneously, there is a risk to effective design, proper clinical validation, optimal build, training and adoption. Examples of simultaneous work noted by the NYGH team included: building order sets while the custom order catalogue is still being built and clinically reviewed; starting testing while clinical validation of system design and content is still underway or not complete; selecting devices for clinical use without system design/build being finalized; and planning work for training without project scope and final design being completed.

Suggested Mitigation Strategies:

- Ensure project components with dependencies are sequenced in time so that they are after the components they are dependent upon. For example, do not build order sets until each facility's custom order catalog has been built and clinically validated; do not start unit testing until after system build is complete and has been fully clinically validated; complete future state workflows before selecting devices for clinical use, and so on.

- Clinicians need to review and validate build before moving forward to testing. Do not rush design, as sub-optimal product will not result in adoption.

Risk #2:
The original development methodology outlined in the consultant contracts signed by PHSA was that system design and build would be completed in stages, with frequent opportunities to see build prototypes and for clinicians to provide feedback along the way. Instead, due to difficulties with consultants completing the build, no prototypes have been made available and clinicians have not been able to see how their design decisions will look in the system. This is a major risk to project success. It is almost 100% certain that clinicians will not be happy with the first version of the build that they see in the system. Consultants on the CST project are pushing for "sign off" on build and starting testing.

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Suggested Mitigation Strategies:

- System development must be approached using an agile and iterative process of: initial design (by core project Clinical Champions working with builders) → build prototype → demo to front-line clinicians → refine build based on feedback → repeat demo → further refinement based on feedback, and so on until clinicians are comfortable with the build and the accompanying future state clinical workflows. This process is essential to success because in our experience, clinicians will not be able to adequately visualize future state and give appropriate feedback until they can see and use actual system build in a demo environment.

- While compiling design decisions and working on system build, the project team will become aware of certain items on which it will be difficult for clinicians to reach consensus because Cerner does not support an ideal workflow (for example, the process of issuing "suggested orders"). In this case, before engaging front-line clinicians it is best for the project team "do their homework" in advance – research different options for a solution, then for each potential solution summarize pros/cons, and build prototypes for clinicians to view in a demo environment. Then, when meeting with the clinicians, it will be easier and more efficient to reach consensus on the best option. The conversation will be focussed on options that are realistically possible within the constraints of the Cerner software, and clinicians will be able to understand the options because they will see a demonstration of each.

- The project team should never make crucial design decisions without first demonstrating the implications to clinicians in a demo environment, because clinicians are unlikely to arrive at an optimal decision if they cannot visualize the system they will be using in future state.

- No matter how much pressure there is from consultants to meet a certain timeline, do not sign off on any build or start any testing until build has been demonstrated to clinicians, there has been opportunity for multiple rounds of clinical feedback and build adjustment, and the project team is comfortable that final build has been fully validated by clinicians.

Risk #3:

System design specification documents (such as "Design Decision Matrix" or similarly-named spreadsheets) were/are being completed by front-line clinicians at PHSA. This is not recommended because: 1) Front-line clinicians usually do not have the system build knowledge to completely understand the meaning or implications of design decisions they are being asked to make, resulting in suboptimal decision-making; and 2) Clinicians can become disengaged from the project when being asked to complete documents with a lot of technical jargon that does not seem clinically relevant to them.

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Suggested Mitigation Strategies:

- Instead of involving front-line clinicians, the recommended approach for completion of system design decision documents is a co-operative effort between core project Clinical Champions and builders who have technical system knowledge. Core project clinician champions have better familiarity with Cerner terminology and functionality than front-line clinicians. Working together with builders, they will have the time and the patience required to develop a deep understanding of the implications for each design decision. Sometimes, there may be more than one viable design option. In these cases, the Clinician Champion can distill the main design questions down into simple clinical scenarios, which can be demonstrated in a meaningful and efficient way to front-line clinicians, optimizing decision-making.

- Be careful not to rely solely on Cerner content such as START and MethodM documents. START content usually does not come even close to meeting real clinical needs; often starting from scratch is required. MethodM documents (including Design Decision Matrices) often leave out important workflow and design decisions – these will need to be identified, compiled and addressed by your project team.

Risk #4:

The NYGH team observed that the order set build process has been rushed ahead using a generic order catalogue, because the custom PHSA order catalogue is not yet complete or clinically validated. Also, there are deficiencies in the custom order catalogue build/validation process. This is a major risk to project success because:

1) An order catalogue that has not been properly designed and clinically validated will lead to adoption and safety risks. Clinicians will be frustrated because orders will be unintuitive to find and use. They may inadvertently select incorrect orders because they cannot find what they need.

2) Front-line clinicians are reviewing order set content that will not match the final version they will use in Cerner (since all generic orderables will need to be changed to match the custom order catalogue when it is complete). This presents a safety risk since the clinical meaning of orders may change in the final version of order sets based on the new catalogue, and represents an adoption risk because clinicians are not reviewing on a “what you see is what you will get” process.

Suggested Mitigation Strategies:

- Stop the order set build process until the first version of the custom order catalogue is completed and has been clinically validated.

- It is well worth the additional time to develop a robust order catalogue build and validation process, which should include:
    - An interdisciplinary team of builders familiar with Cerner, Clinical Champions as well as front-line clinicians for periodic validation. When orders affect multiple departments, ensure individuals from each of the involved departments are included in order design and review.

  - Create a style guide for order development, which should include acceptable abbreviations, standard terminology and code sets for OEF fields, decisions on use of range dose/range frequency, and so forth. All orders, regardless of department or facility, should adhere to this style guide. Form a small core of central project staff that are responsible for review of all orders build against the style guide.
  - Careful examination of every orderable to ensure:
    1) the root name of the order is intuitive for clinicians to find based on common clinical language;
    2) there are synonyms for each order so that each is easily findable based on multiple different search terms;
    3) the order entry formats have been reviewed to minimize un-necessary fields (e.g. orders should not be used as documentation), minimize un-necessary mandatory items, ensure that choices within fields are standardized using code sets where possible; and that no fields are missing
  - Mock-up of orders in a Cerner demo domain, with validation by clinicians. Be sure to involve physicians with specialty knowledge of the orders being reviewed (e.g. Cardiology orders reviewed by Cardiologists, Orthopedics orders reviewed by Orthopedic Surgeons, etc).

- Once most orders have been completed and validated in Cerner, version 1 of the custom order catalogue should be exported from Cerner and uploaded to Zynx. Order set build can then resume. Zynx should be used as the main tool to build and review order sets.

- Any remaining unfinished orders awaiting final review/validation in Cerner can be exported incrementally to Zynx when completed. Order catalogue development will be an iterative process, with several successive catalogue uploads required over time. This is because need for new orders and changes to orders will be identified as order sets are being built and reviewed. For this reason, do not expect the order catalogue to be "final" the first time – this would delay starting order set build in Zynx. Instead, placeholder terms can be built as required in Zynx for orders pending final build, to assist clinicians in seeing orders as they should eventually appear in Cerner.

Risk #5:

In the CST project there has been a good level of engagement with clinicians to discuss order set content. However, there is an insufficiently robust methodology to determine order set scope, include and maintain evidence in order sets, as well as obtain adequate clinician review and validation of order sets once built. Zynx evidence links have not been included in CST order set build, which results in lost opportunity for clinicians to discuss evidence in the order set review process (risking poor consensus), lost opportunity for clinicians to use evidence in the course of clinical care (potentially reducing quality and safety), and increased difficulty in maintaining order sets with new/updated evidence over time.

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Suggested Mitigation Strategies:

- For each facility, determine order set build scope by doing a "Gap Analysis". This requires obtaining a year's worth of retrospective discharge data, rank ordering the diagnoses in descending sequence by volume of cases per year, then taking the top 80% of the diagnoses from the list. The number of order sets in this 80% by volume list, after subtracting the number of matching electronic order sets already created (e.g. from other facilities) will be the "gap" – the number of order sets required to build at that facility before go-live.

- There should be a core order set team at each facility that is comprised (at a minimum) of Clinical Champions, pharmacists, and Clinical Informaticists who specialize in order catalogue build and order set build. It is important that builders are "at the table" in order set meetings, so that clinicians understand what can and cannot be built.

- Develop and adhere to a standardized style guide for all order sets. This should include conventions for abbreviations, sorting of order categories, orders and order sentences within an order set, standards for linked evidence and evidence documents (e.g. use of static links such as PubMed), conventions for order defaults, and so on.

- Avoid using Multi-Phase PowerPlans at initial go-live. They are complicated and time-consuming to build, and are confusing for inexperienced clinicians to use.

- Do not allow the option for PowerPlan Favourites (i.e. allowing physicians to customize order sets by adding or deleting options or changing defaults, and then saving to their Favourites folder). This will completely undermine efforts to standardize care and will compromise the ability to improve quality and safety, since updates to facility-wide order sets will not be reflected in physician-customized "Favourite" plans.

- Consider asking Zynx to come to PHSA and assist in creating the first 12 to 24 order sets. They provide this service for free, and it will help to train your order set staff to work independently using effective methodology.

- We recommend employing a standard 5-step method for all order set development:
    1. PROTOTYPING: Start with order set content from Zynx if available, and include the associated Zynx evidence links. Also consider order sets from the Canadian CPOE Toolkit library, which are available in Zynx for free. Paper order sets from PHSA are an important resource, but should never simply be converted into electronic form since: 1) this will leave out Zynx evidence links; 2) some content on the paper version may be out of date; 3) paper orders are fundamentally different from electronic ones. Always build order sets using your custom PHSA order catalogue, extracted from Cerner into Zynx.
    2. REVIEW BY NON-PHYSICIAN CLINICIANS AND DIAGNOSTIC SPECIALTIES: Use Zynx Viewspace.
    3. REVIEW BY PHYSICIANS: Use Zynx Viewspace. Ensure physicians with subject matter expertise for each particular order set are involved (e.g. Orthopedics for hip fracture, Cardiology for Congestive Heart Failure).

4. CONSOLDIATION OF REVIEW COMMENTS: Make changes in the order sets based on reviewer ViewSpace suggestions, unless there is disagreement among reviewers, in which case meeting(s) with a small group of individuals may be required to reach consensus.
5. APPROVAL OF ORDER SETS: Requires clearly written policy outlining the accepted order set approval and update process. Consider involvement of MAC or an arm's length committee of MAC.

Data Governance

Risk #1:
With archived data from old systems and new content being developed in new systems, now is the time to define a data governance model. This can be closely tied to risk in project governance where deliverables need to be more discretely defined. At the point of defining specific content deliverables to each working group, data stewards can also be identified.

Suggested Mitigation Strategies:

- Develop a data governance model. This model will define owners of data and hold people and/or groups accountable for monitoring of data quality, integrity, adherence to standards and reporting requirements.

- Consider developing data auditing tools to be used for go live performance metrics and ensure staff are using the system appropriately. It is better to correct bad practices early.

- Identify and engage data stewards early in system design. These resources will be critical in understanding data analytic capabilities and can offer input into key indicators that need to be integrated into system design.