

Supplementary material

An economic analysis of a system wide Lean approach: Cost estimations for the implementation of Lean in the Saskatchewan healthcare system for 2012-2014

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Table S.1: Cost for an RPIW

| | | Cost in current Canadian dollars | | |
|-------------------------------------|-----------------------|----------------------------------|-----------------|-----------------|
| | | Low | Average | High |
| | Total number of hours | | | |
| Team Lead | 112.5 | 5699 | 6282 | 6952 |
| Sub-team Lead | 103.12 | 5224 | 5759 | 6372 |
| KPO support | 159.37 | 7991 | 8809 | 9748 |
| Lean Leader Participant | 45.69 | 2362 | 2604 | 2881 |
| Physician | 15.51 | 2909 | 2909 | 2909 |
| Patient/Family Representative | 40.08 | 374 | 721 | 1069 |
| Other Team Members | 156.46 | 5428 | 5907 | 6342 |
| Printing/supplies ^[1] | n/a | 150 | 200 | 250 |
| Travel/accommodation ^[2] | n/a | 1125 | 1500 | 1875 |
| Overtime compensations | n/a | 800 | 800 | 800 |
| TOTAL | | \$32,062 | \$35,491 | \$39,198 |

Note: It is assumed that there is one team lead, sub-team lead and a KPO support person in each event. [1] We assumed that the cost of printing and supplies is incurred in week -3 and the event week with an average weekly cost of \$100. Then we inflated (deflated) it by 25% for high (low) scenario. [2] There might be travel, accommodation, parking, and other incidental expenses. We assumed an average of one out-of-region person who will be travelling for the event with an average cost of \$1,500, that was inflated (deflated) by 25% for high (low) scenario. n/a stands for not applicable.

Table S.2: Cost for a 5S activity

| | | Cost in current Canadian dollars | | |
|-------------------------|-----------------------|---|-----------------|-----------------|
| | | Low | Average | High |
| | Total number of hours | | | |
| Team Lead | 37.5 | 1907 | 2137 | 2365 |
| Sub-team Lead | 37.5 | 1907 | 2137 | 2365 |
| KPO support | 37.5 | 1907 | 2137 | 2365 |
| Lean Leader Participant | 1.04 | 54 | 60 | 66 |
| Physician | 3.13 | 587 | 587 | 587 |
| Other Team Members | 98.95 | 3442 | 3735 | 3981 |
| Printing/supplies | n/a | 75 | 100 | 125 |
| Overtime compensations | n/a | 272 | 272 | 272 |
| TOTAL | | \$10,076 | \$11,165 | \$12,001 |

Note: It is assumed that there is one team lead, sub-team lead and a KPO support person in each event. We assumed that the cost of printing and supplies is \$100. Then we inflated (deflated) it by 25% for high (low) scenario. n/a stands for not applicable.

Table S.3: Cost for a Kaizen Basic Workshop

| | Number of people | Cost in current Canadian dollars | | |
|------------------------|------------------|----------------------------------|----------------|-----------------|
| | | Low | Average | High |
| Workshop Participants | 30 | 7196 | 7923 | 8730 |
| Physician | 0.43 | 484 | 484 | 484 |
| Facilitator/instructor | 1 | 335 | 381 | 427 |
| Travel/accommodation | n/a | 113 | 150 | 187 |
| Printing/supplies | n/a | 75 | 100 | 125 |
| Overtime compensations | n/a | 299 | 299 | 299 |
| TOTAL | | \$8,502 | \$9,337 | \$10,252 |

Note: Based on our review of workshops across health regions and other healthcare providers, we determined that the average number of participants in each workshop is about 30 people per session. The workshop takes one day (7.5 hours). Average wages for workshop participants are assumed to be the provincial average in healthcare sector. The KPO person is assumed to be a Kaizen Lead Specialist with monthly salary range of \$5,752- \$7,476 (Government of Saskatchewan, 2014a). There are 16,963 individuals (including 244 physicians) participated in the workshops in the period of April 2012 and March 2014. The physician remuneration is \$187.50 per day (Government of Saskatchewan, 2014b). n/a stands for not applicable.

Table S.4: Cost for a Mistake Proofing Project

| | | Cost in current Canadian dollars | | |
|------------------------|-----------------|---|-----------------|-----------------|
| | Number of hours | Low | Average | High |
| Team Lead | 120 | 6203 | 6838 | 7566 |
| Sub-team Lead | 120 | 6203 | 6838 | 7566 |
| Team members | 562 | 29029 | 32000 | 35409 |
| Overtime compensations | n/a | 1016 | 1016 | 1016 |
| TOTAL | | \$42,451 | \$46,692 | \$51,557 |

Note: Average number of team members for a typical event is 4.8 individuals. Each team member is expected to participate 117 hours during the course of the event. The wage rate for each participant is assumed to be the same with the government managers' wage in healthcare sector. These are \$51.69 (25th percentile), \$56.98 (average), and \$63.05 (75th percentile). n/a stands for not applicable.

Table S.5: Cost for a North American Tour

| | Descriptions | Cost in current Canadian dollars | | |
|------------------------|--|----------------------------------|----------|----------|
| | | Low | Average | High |
| Participants | 20 individuals | 38768 | 42735 | 47286 |
| Travel | Air (Saskatoon-Salt Lake City-Seattle) | 11280 | 12420 | 13760 |
| Accommodation | 5 nights/person | 13000 | 14000 | 15000 |
| Per-diem | 6 days/person | 6120 | 6120 | 6120 |
| Local transportation | Travel to the airports | 1500 | 1500 | 1500 |
| Overtime compensations | See text | 152 | 152 | 152 |
| TOTAL | | \$70,820 | \$76,927 | \$83,818 |

Note: Based on our communication with the PKPO, we assumed total number of participants to be 20 for each NAT. As a part of the tour, they spent time in Salt Lake City for one day followed by 4 days stay in Seattle (United States). The wage rate of the participants is assumed to be of Government managers in health care (Government of Saskatchewan, 2013). Airfare is computed at the economy rate with the low airfare of \$564 per person, average of \$621 per person, and high fare of \$688 per person. The accommodation per night is calculated as low as \$130 per person, on average \$140/ person and high as \$150/person. The per diem rate is obtained from Canada Revenue Agency (2014).

Table S.6: Cost for a Kanban event

| | Number of hours | Cost in current Canadian dollars | | |
|------------------------|-----------------|----------------------------------|-----------------|-----------------|
| | | Low | Average | High |
| Team Lead | 90 | 4652 | 5128 | 5675 |
| Sub-team Lead | 90 | 4652 | 5128 | 5675 |
| KPO Support | 75 | 2876 | 3308 | 3738 |
| Coordinator | 53 | 1241 | 1477 | 1593 |
| Team members | 226 | 7216 | 7958 | 8667 |
| Overtime compensations | n/a | 676 | 676 | 676 |
| TOTAL | | \$21,313 | \$23,675 | \$26,024 |

Note: Average number of team members for a typical event is 6.03 individuals. Each team member is expected to participate 37.5 hours during the course of the event. We used the manager wage rates for team lead and sub-team leads, and average wage in health care sector for the team members. For the coordinator and the KPO support personnel, we used the corresponding wage rates for these job titles. The wage rate for each participant is assumed to be the same with the government managers' wage in healthcare sector. These are \$51.69 (25th percentile), \$56.98 (average), and \$63.05 (75th percentile) (Government of Saskatchewan, 2013). The cost related to the sensei, and the interpreter for the sensei has not been included in our estimates above. n/a stands for not applicable.

Table S.7. Annual cost of Lean at Saskatoon Health Region due to KPOs/KOTs

| | Number of new hires | personnel cost |
|---------------------|---------------------|----------------|
| Manager | 6 | 666,616 |
| KPO Lead specialist | 2 | 194,376 |
| KPO/KOT specialist | 18 | 1,345,734 |
| Analyst | 2 | 137,319 |
| Coordinator | 1 | 54,346 |
| Total | 29 | 2,398,391 |

Notes: We used average wage and benefit rates for all personnel in this table. KPO Lead specialists are assumed to be paid at the upper bound of KPO Lead specialist pay range while the KPO/KOT specialists are assumed to be paid at the lower bound. Analysts are assumed to be paid at the average rate for healthcare sector.

References:

Canada Revenue Agency. 2014. Meal and Vehicle rates used to calculate travel expenses for 2013 and previous years. <http://www.cra-arc.gc.ca/tx/ndvdl/tpcs/nem-tx/rtrn/cmpltng/ddctns/lns248-260/255/rts-eng.html>. Accessed 2 July 2014.

Government of Saskatchewan. 2014. Kaizen Lead Specialist- CON000888. (job posting Feb, 2014)

Government of Saskatchewan. 2013. Saskatchewan Wage Survey Report 2011. <http://ae.gov.sk.ca/sk/wage-survey-report-2011>. Accessed 6 March 2013.