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| **A Proposed List of Prioritized Candidate Technologies for Health Technology Reassessment in British Columbia****Part II** |
| **Report prepared for the British Columbia Ministry of Health** |
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# WHAT IS THE AIM OF THIS WORK?

The objective of this report is to propose a process for identifying a draft prioritized list of candidate health technologies for which reassessment is recommended in British Columbia (BC). This report is intended to serve as Part II of the overall development of the provincial health technology reassessment strategy for British Columbia (BC) and accompanies the work detailed in the report titled *“A Proposed Framework for Health Technology Reassessment in British Columbia – Part I”* [1].

# DESCRIPTION OF THE APPROACH

A multi-phase approach was undertaken to develop the draft list of prioritized candidate technologies for reassessment. This work follows the *data-driven approach* outlined in Part I of the report.

## Existing Low Value Technology Recommendations

There are a number of health technologies that have been previously identified as low value through various international and Canadian initiatives. In particular, the recommendations from the Choosing Wisely Canada lists [2], the National Institute for Care and Health Excellence (NICE) “Do Not Do” recommendations [3], and the list of 150 low value technologies in the Australian Medical Benefits Schedule (MBS) [4] comprise over 1300 low value technologies for which to consider for reassessment. As discussed in Part I of the report, these recommendations were developed through various approaches, including stakeholder engagement, literature searches, and also through multiple technology assessments (complete details of how each set of recommendations was developed are available elsewhere ([2-4]).

Given this established collection of low value technologies, we decided to leverage this body of work and combine recommendations from the three aforementioned sources to form an initial list of potential candidate technologies for reassessment in BC. We collected the low value technology recommendations from the website of the Choosing Wisely Canada campaign, the online repository of recommendations on the NICE website, and the article of low value technologies in Australia published by Elshaug et al. [4]. We copied the language verbatim from each recommendation and then catalogued them by the clinical specialty associated with the technology use.

This starting point of technologies—listed because they were identified as technologies with limited or no clinical benefit for select population—serves as an efficient beginning as the items have already been considered and filtered based on clinical outcomes. This filter was among the proposed considerations in the BC reassessment framework outlined in Part I [1].

## Data Sources

We employed a data driven approach to quantify the practice of the recommendations in the BC health system context. Thus, we examined whether each of the given recommendations could be identified in one of the available administrative health databases in the province.

Specifically, three administrative health databases were used:

1. *The Discharge Abstract Database (DAD)* to identify use of the low value technology in hospital;
2. *The Medical Services Plan (MSP) Physician claims database* to identify when a (non-laboratory) low value technology was performed and claimed for reimbursement by a physician;
3. *The MSP Laboratory database* to identify when a low value laboratory test was performed and claimed for reimbursement by a physician.

In the BC DAD data, patient conditions or diagnoses are coded using International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada or ICD-10-CA system [5], and the services and procedures used in hospital are coded using the Canadian Classification of Health Interventions or CCI system, which was developed by CIHI to accompany ICD-10-CA [6]. In the MSP physician claims and laboratory data, patient conditions are coded using the ICD-9-CM system [7], and the procedures or services used by physicians (for which they are seeking reimbursement for) are coded using MSP-specific billing or fee item codes [8, 9]. A summary of these coding systems is provided in **Table 1**.

Access to anonymized, aggregate-level data was provided by the BC Ministry of Health and facilitated by the Senior Health Economist with the Health Technology Review office, Partnerships and Innovation Division. Data was provided for the past five fiscal years from 2010-11 to 2014-15.

**Table 1.** Coding Systems Applied to the Low Value Technology Recommendations

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| --- | --- | --- |
| **Data Source** | **Technology** | **Clinical Diagnosis** |
| DAD | CCI  | ICD-10-CA |
| MSP Physician and Laboratory Claims | MSP Fee Item Code | ICD-9-CM |

## Review and Coding of Recommendations

The starting “list” of potential candidate technologies for reassessment comprised a total of 1350 recommendations. In each recommendation, a low value technology was either listed (e.g. discectomy [4]) or use of a technology was described as low value for a given clinical indication or diagnosis (e.g. computerized tomography or ultrasound to diagnose appendicitis [4]). The extent to which these areas of low value care exist in the BC health system can be evaluated within the administrative data by mapping both the technologies and clinical indications to the appropriate service/procedure and diagnostic codes applied within the respective databases.

Each of the recommendations was reviewed by two independent reviewers and was excluded if it:

1. Was a drug technology
2. Was a technology not covered under the BC MSP (i.e. publicly-funded)
3. Contained a technology with no identifiable CCI or MSP fee item code
4. Contained language or qualifiers that could not be identified in the administrative data (i.e. recommendation was found to be clinically nuanced)

Examples of the fourth exclusion criterion are provided in **Appendix 1** and a complete list of excluded technologies is provided in **Appendix 2**.

The remaining recommendations were then coded using the appropriate service/procedure and diagnosis codes (**Table 1**) in order to examine whether they have occurred (and at what cost) in-hospital or claimed by a physician in the past five fiscal years. If a recommendation included a restriction that was identifiable within the data sources (i.e. age, gender), such restrictions were also added to the coded recommendations.

All of the coding was tracked in MS Excel and completed in duplicate to ensure an accurate and exhaustive collection of codes for each recommendation. Any disagreement in coding between researchers was resolved through discussion and consensus. Where appropriate a third researcher was consulted.

## Analysis of Administrative Data

A total of 74 recommendations were able to be coded. This list of codes was provided to the senior analyst at the BC Ministry of Health as a data request (Appendix 3). All record-level data queries and analyses were performed by the senior analyst and advised by the research team. Detailed instructions for the data query, by administrative database, are available in Appendix 4.

For each recommendation, the outcomes of interest were: total frequencies (i.e. number of time the recommendation was observed) and costs for a given fiscal year. The total frequency of physician claims and related costs are two variables directly available from the MSP physician claims data. For the DAD, these outcomes were computed by first obtaining an average resource intensity weight (RIW[[1]](#footnote-1)) and multiplying this value by: 1) the cost per standard hospital stay (CSHS) for BC [10] and then 2) the number of times this recommendation was observed (i.e. total frequency) for the fiscal year examined.

## Prioritization of Candidate Technologies

Based on the proposed framework for reassessment, the prioritization filter of high budgetary impact was applied to the technologies that resulted in any frequency and cost from the administrative health data (i.e. observed use). High budgetary impact was defined as a high total cost from the use of a low value technology due to the high cost per technology, high volume or use, or an aggregate measure of both.

## Clinical Expert Input

The draft list of potential technologies that met the high budgetary impact filter was then discussed with the project Advisory Committee and in subsequent meetings specifically with clinical members of the Advisory Committee. The list was reviewed in order to ensure that the potential candidates could legitimately be put forward for consideration for reassessment (i.e. there were no obvious clinical or administrative flags).

# LIST OF EXAMPLE PRIORITIZED TECHNOLOGIES

A schematic of the methodological steps and resultant number of candidate technologies from this data-driven process is provided in Figure 1.

From the list of 74 technologies examined within the administrative health data, 47 were observed (i.e. any frequency and cost) in the past five fiscal years. To subsequently prioritize these technologies for reassessment, an example of a high budgetary impact filter would be the prioritization of technologies whose total estimated expenditures (i.e. in-hospital and MSP claims) exceeded $1 million dollars in the most recent fiscal year. This would ultimately result in 9 potential candidate technologies for reassessment.

Table 2 outlines these example low value technologies and the observed frequencies and associated costs in the fiscal year 2014/15. Advisory Group clinical review did not lead to changes in the initial identified list, although other technologies were suggested for inclusion as potential reassessment topics, including tonsillectomy and rhizotomy.



**Figure 1.** Flow Chart of Proposed Data-Driven Process

**Table 2.** List of Example Prioritized Technologies for Recommendation

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| --- | --- | --- | --- |
| **Low Value Technology Recommendation**  | **Frequency in FY 2014/15** | **Total Estimated Costs in 2014/15** | **Source** |
| 1 | Diskectomy/discectomy | DAD: 3323 eventsMSP: 53 claims  | In-hospital costs\*: $55.86M MSP costs: $38,800 | [4] |
| 2 | Radical prostatectomy and external beam radiation therapy | DAD: 970 events | In-hospital costs: $8.09M | [11] |
| 3 | Removal of adenoids | DAD: 3772 events MSP: 1243 claims | In-hospital costs: $2.77MMSP costs: $125,907 | [3, 4] |
| 4 | Dilation and Curettage as a diagnostic tool or therapeutic treatment  | DAD: 6557 eventsMSP: 4263 claims  | In-hospital costs: $2.76M MSP costs: $620,677 | [3, 4] |
| 5 | Vertebral biopsy | DAD: 164 events | In-hospital costs: $2.81M | [4] |
| 6 | Suprapubic urinary catheter  | DAD: 311 events | In-hospital costs: $6.34M | [4] |
| 7 | Intravenous urography (IVU) for urothelial tumours | MSP: 65,042 | MSP costs: $5.63M | [4] |
| 8 | C-reative protein testing | MSP: 195,711 claims | MSP costs: $1.49M | [3, 4] |
| 9 | Prostate Specific Antigen (PSA) testing | MSP: 124,058 claims | MSP costs: $1.49M  | [4] |

**\***Average in-hospital costs do not solely reflect the technology use, but are rather based on the RIW that factor in the total costs accrued by the average patient that received the service or procedure with that technology.

\*\* Specific information for each technology is found in Appendix 5.

#  FUTURE CONSIDERATIONS

The proposed data-driven approach provides a mechanism for developing an initial list of prioritized candidate technologies that may be recommended for reassessment in the BC health system. As depicted in the proposed BC reassessment framework [1], this process of technology selection represents the first of three phases proposed in the overall reassessment process.

The list of example prioritized technologies (Table 2) demonstrates the feasibility of examining the administrative health data assets of the BC health system. However, at this stage, it is important to emphasize that these technologies are examples of those that may undergo subsequent steps in the reassessment process and the frequencies and associated costs need further validation. Having said that, it is clear that there are areas for potential reassessment based on the fact that technologies were identified within the BC health system that are of high budgetary impact and were previously recommended by other initiatives or in other jurisdictions as low value.

One area we recommend revisiting with an expert clinical lens is the initial collection of 1350 recommendations. In particular, we recommend that a clinical expert group review the 725 ‘clinically nuanced’ technologies. The project Advisory Group strongly supports this action, noting the challenge that procedure or diagnosis codes need to be identified for these technologies or services in order for the Ministry of Health to determine if indeed they are of high cost and frequency. It is also highly likely that a call for opportunities for reassessment to various clinical groups and specialty areas will identify further areas for consideration.

# APPENDICES

**Appendix 1.** Examples of Language or Wording Identified as “Clinically Nuanced”

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| **Examples of language obtained from the initial list of technologies** | **Reason for Exclusion** |
| * “asymptomatic patients”;
* “absence of clinical indications”;
* “with uncomplicated symptoms”;
* “unless red flags are present”;
* “without alarm symptoms”.
 | The language used was vague; did not mention any specific signal or symptom.  |
| * “low-risk patients”;
* “high-risk patients”;
* “unless directly indicated by the risk profile of the patient”.
 | Imprecise/unexplained consideration of risk. |
| * “minor injuries”;
* “unless there is a palpable abnormality”.
 | Health conditions not properly described. |
| * “pre-operative”;
* “post-operative”;
* “who have had a myocardial infarction more than 3 months earlier”;
* “between office visits”.
 | Temporal consideration not adequately retrieved from the administrative data. |
| * “must not be used to prevent”;
* “should not be used as a diagnostic tool”;
* “should not be used as first-line treatment”.
 | Unable to determine rationale underlying physicians decision for procedure. |
| * “invasive breast cancer; hormone-refractory prostate cancer”;
* “clinical stages I and II breast cancer with negative clinically negative lymph”
 | Disease is highly detailed in the recommendation; however coding systems for classification of diseases do not have the same level of description.  |
| * “in children”;
* “in young adults”;
 | Exact age range not specified. |

**Appendix 2.** List of Excluded Technologies for Data Request

Please see attached spreadsheet.

**Appendix 3.** List and Codes for 74 Low Value Care Recommendations to Query in BC Administrative Health data

Please see attached spreadsheet.

**Appendix 4.**

For the DAD data request: FY 2010/11 to FY 2014/15

1. If there is a ICD10\_DX diagnosis code(s) AND a CCI procedure code(s) listed, please count

2. If only CCI is listed, but NO ICD10\_DX (I.e. N/A), please count

3. If both ICD10\_DX and CCI procedure codes are not listed (I.e. N/A) - please DO NOT COUNT.

When searching:

The CCI code(s) can exist at any position (1-20) BUT the ICD10\_DX code(s) should be in the primary diagcd1 position

Remember that within a cell, the codes are separated by “OR” and between cells, the codes are separated by “AND”

Outputs requested:

* Frequency for each of the recommendations (I.e. ICD10\_DX and CCI combinations [or CCI alone in some cases])
* Average RIW for each of the recommendations
* Average CMG/grouper cost for each of the recommendations (if cannot provide that is ok)

For Physician Claims request: FY 2010/11 to FY 2014/15

1. If there is a ICD9\_DX diagnosis code(s) AND a procedure fee code (in column G) listed, please count

2. If there is a ICD9\_DX diagnosis code AND a lab fee code (in column H) listed, please count

3. If only a lab fee code is listed, but NO ICD9\_DX (i.e. N/A), please count

4. If only a procedure fee code is listed, but NO ICD9\_DX (i.e. N/A), please count

5. If only a ICD9\_DX code is listed, but NO procedure code is blank/highlighted grey or the lab fee code is N/A, please DO NOT COUNT!

6. If ICD9\_DX, procedure fee code and lab fee code are all NOT listed (I.e. Blank or N/A), please DO NOT COUNT.

When searching:

Note that within a cell, the codes are separated by “OR” and between cells, the codes are separated by “AND”

Outputs requested:

* Frequency for each of the recommendations (I.e. ICD9\_DX and procedure fee code combination or ICD9\_DX and lab fee code combination [or fee codes alone in some cases])
* Total cost each of the recommendations

**Appendix 5 (next page)**

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| 1 | Diskectomy/discectomy | - When 2 treatment methods for sciatica were compared (Tubular vs conventional micro discectomy) the conventional technique showed significantly better primary functional outcomes on the RDG at 1yr and better secondary outcomes on the visual analog scale for leg and back pain. - Neurologic outcomes are similar in surgical and nonsurgical patients. Noteworthy, predominant leg pain and associated symptoms have been found in patients with favourable surgical results. |
| 2 | Radical prostatectomy and external beam radiation therapy | Minimally invasive radical prostatectomy (MIRP) resulted in shorter hospital stay, fewer respiratory and surgical complications and strictures, similar post-operative cancer therapies compared to radical prostatectomy (RRP). |
| 3 | Removal of adenoids | It is uncertain whether adenoidectomy is effective in children with recurrent or chronic nasal symptoms. |
| 4 | Dilation and Curettage as a diagnostic tool or therapeutic treatment  | - A diagnostic study (n = 269) on women with AUB found that 154 of 170 (90.6%) samples obtained by Pipelle biopsy gave enough information for histology, compared with 66 of 97 (68%) of those obtained by dilatation and curettage (p < 0.0001 for difference).- Limited evidence is available on the use of therapeutic dilatation and curettage for Heavy Menstrual Bleeding, but the one study that was identified showed that any effect was temporary. |
| 5 | Vertebral biopsy | Radiologists are best placed to draw attention to thepresence of vertebral fractures, most of which areclinically silent. Magnetic resonance imaging supplemented if necessary by computed tomography is usually sufficient to enable distinction betweenosteoporotic and non-osteoporotic vertebral fracture,without a need for percutaneous biopsy. |
| 6 | Suprapubic urinary catheter  | There is evidence that suprapubic catheters have advantages over indwelling catheters in respect of bacteriuria, recatheterisation and discomfort. |
| 7 | Intravenous urography (IVU) for urothelial tumours | CTU is more effective in detecting urothelial tumors in haematuria patients than IVU. |
| 8 | C-reactive protein testing | - The CRP test is insufficiently sensitive or specific to rule in or out pneumonia. The poor quality of methodology in diagnostic studies prevents consistent evidence and the support of use of CRPs to guide antibiotic prescription.- In primary care additional CRP testing is unlikely to change the probability of CAP and management decisions- Evidence of poor tests for diagnosing urinary tract infections (UTI). |
| 9 | Prostate Specific Antigen (PSA) testing | Men 75 to 80 years old with a PSA less than 3ng/ml are unlikely to die or experience aggressive prostate cancer during their remaining life, suggesting that PSA testing may be safely discontinued in these men. |

# REFERENCE LIST

1. The Health Technology Assessment Unit of the University of Calgary; Centre for Clinical Evaluation and Epidemiology University of British Columbia: A Proposed Framework for Health Technology Reassessment in British Columbia: A Report Prepared for the British Columbia Ministry of Health - Part I. In*.*; 2016: 1-29.

2. The Choosing Wisely Lists [<http://www.choosingwisely.org>]

3. Do Not Do Recommendations [ [https://www.nice.org.uk/savingsandproductivity/collection?page=1&pagesize=2000&type=do not do](https://www.nice.org.uk/savingsandproductivity/collection?page=1&pagesize=2000&type=do%20not%20do)]

4. Elshaug AG, Watt AM, Mundy L, Willis CD: Over 150 potentially low-value health care practices: an Australian study. *Med J Aust* 2012, 197(10):556-560.

5. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada, Volume One — Tabular List [<https://www.cihi.ca/en/icd_volume_one_2015_en.pdf>]

6. Canadian Classification of Health Interventions, Volume Three — Tabular List [<https://www.cihi.ca/en/cci_volume_three_2015_en.pdf>]

7. Diagnostic Code Descriptions (ICD-9) [<http://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/msp/physicians/diagnostic-code-descriptions-icd-9>]

8. MSC Payment Schedule [<http://www2.gov.bc.ca/assets/gov/health/practitioner-pro/medical-services-plan/msc-payment-schedule-june-2016.pdf>]

9. Schedule of Fees For the Laboratory Services Outpatient: Payment Schedule [<http://www2.gov.bc.ca/assets/gov/health/practitioner-pro/laboratory-services/schedule_of_fees_-_laboratory_services_payment_schedule.pdf>]

10. Patient Cost Estimator [<https://www.cihi.ca/en/spending-and-health-workforce/spending/patient-cost-estimator>]

11. Elshaug AG, Hiller JE, Moss JR: Exploring policy-makers’ perspectives on disinvestment from ineffective healthcare practices. *International journal of technology assessment in health care* 2008, 24(01):1-9.

1. RIWs provide an estimate of the relative cost of resources used in the care of similar groups of patients; the RIW values are calculated for inpatient and day surgery groups based on estimates of the expected length of stay and/or the costs [add ref] [↑](#footnote-ref-1)