Court File No.: T-2030-13

FEDERAL COURT

BETWEEN:

NEIL ALLARD
TANYA BEEMISH
DAVID HEBERT
SHAWN DAVEY

Plaintiffs

and

HER MAJESTY THE QUEEN IN RIGHT OF CANADA

Defendant

AFFIDAVIT OF PAUL GROOTENDORST

I, Paul Grootendorst, Associate Professor, of the Town of Oakville, in the Province of Ontario, SWEAR THAT:

1. I am an Associate Professor, employed by the Faculty of Pharmacy, University of Toronto, in the Province of Ontario and as such have personal knowledge of the matters hereinafter deposed to by me, except where same are stated to be based on information and belief and where so stated I verily believe them to be true.

2. I have been retained by the Attorney General of Canada in the above proceeding to provide an expert report for the Court. Attached at **Exhibit "A"** is my expert report, dated February 5, 2014.

SWORN before me at the City of Toronto, in the Province of Ontario, this 5th day of February, 2014.

Commissioner for taking Affidavits in and for the Province of Ontario
(J. Wilson)

Dr. Paul Grootendorst

This is Exhibit "A" referred
to in the Affidavit of PAUL
GROOTENDORST
SWORN before me this 5th day
of February, 2014.

A Commissioner for Taking Affidavits
(J. Wilson)

Expert Report prepared for the Attorney General of Canada

1. Mandate

1. I address the following issues in this expert report.

- Issue #1. I discuss the marketplace trends with respect to the price of medical marijuana that I would expect to see under the Marihuana for Medical Purposes Regulations.

- Issue #2. I discuss the impacts on the regime created by the Marihuana for Medical Purposes Regulations and, in particular, the impacts on Licensed Producers and the cost of medical marijuana, if medical marijuana users were exempt from the requirement under the regime to purchase their medical marijuana from Licensed Producers or Health Canada.

2. My letter of instruction from Counsel for the Attorney General of Canada is attached as **Schedule "A"** to this expert report.

2. Qualifications

3. My name is Paul Grootendorst. I obtained an Honours Bachelors of Arts degree in Economics from the University of Victoria in 1988, a Master of Arts degree in Economics from Queen's University, in Kingston, Ontario in 1990, and a PhD in Economics from McMaster University, in Hamilton, Ontario in 1995.

4. I am a tenured Associate Professor in the Leslie Dan Faculty of Pharmacy, and School of Public Policy and Governance, at the University of Toronto, a position I have held since October 2002. I am also Director of the Division of Social and Administrative Pharmacy at the University of Toronto. Previously, I was an Assistant Professor at the Department of Clinical Epidemiology and Biostatistics at McMaster University, from October 1996 to September 2002. I continue to be an Adjunct Professor at the Department of Economics at McMaster University.

5. My research and teaching focus is in the area of health economics. Health economics uses the tools of microeconomics to analyze resource allocation in the production of health, and healthcare. The field of health economics examines, *inter alia*, how markets allocate different types of health care. The issues I address in this report apply health economics theory, that is, how the market for medical marijuana will evolve under the Marihuana for Medical Purposes Regulations and how the market will evolve should medical marijuana users be exempt from the requirement under the proposed regulations to purchase their medical marijuana from Licensed Producers or Health Canada.

6. My curriculum vitae is attached as **Schedule "B"** to this expert report.

7. I have reviewed the Code of Conduct for Expert Witnesses and am aware of my duty to the Court. Attached as **Schedule "C"** is the signed Certificate Concerning Code of Conduct for Expert Witnesses.

3. Summary of Opinions

8. On the first issue, I expect the price of legal, commercially-sourced medical marijuana to decline over time. This expectation is conditional on the size of the market for medical marijuana supplied by Licensed Producers growing sufficiently large over time. I expect that this market will grow sufficiently large over time under the Marihuana for Medical Purposes Regulations.

9. On the second issue, should medical marijuana users be exempt from the requirement under the regime to purchase their medical marijuana from Licensed Producers or Health Canada, then the size of the legal market for medical marijuana will be smaller than otherwise. Several scenarios are possible, depending on the fraction of users who do not procure their medical marijuana from Licensed Producers or Health Canada.

a) Possibility #1: Prices of commercially-sourced medical marijuana may continue to decline over time but not at the same rate that would obtain should users be required to purchase their medical marijuana from Licensed Producers or Health Canada.

b) Possibility #2: If the fraction of medical marijuana users who do not procure their medical marijuana from Licensed Producers or Health Canada is sufficiently high, then it is possible that commercially-sourced medical marijuana prices increase over time.

c) Possibility #3: If the fraction of medical marijuana users who procure their medical marijuana from Licensed Producers or Health Canada is very low then, it remains a possibility that, under this scenario, there will be no Licensed Producers producing medical marijuana.

I do not take any position on the likelihoods of these three scenarios.

4. Reasons for my Opinions

Issue #1

10. Under the Marihuana for Medical Purposes Regulations (hereafter the "MMPR"), the prices that Licensed Producers charge for medical marijuana will be kept in check. More specifically, the prices charged cannot lead to above-normal profits. The reason is that above-normal profits will cause competing firms to undercut existing prices to increase their market share. Even if existing competing firms do not undercut prices, such profits will invite entry into the market by new Licensed Producers who will. (There are no constraints on the entry of new Licensed Producers; Health Canada will grant licenses to all firms that meet the requirements for producers.)

11. Price competition in the legal market for medical marijuana does require that the market be sufficiently large to accommodate numerous firms. Currently the market for legal medical marijuana is in its infancy. As of February 3, 2014, there are only 6 Licensed Producers of medical marijuana listed on the Health Canada website and I expect sales volumes are low.[1] Thus sales volumes need to grow over time for the market to support a larger number of firms. Below, in section 4.1, I explain why I believe that the medical marijuana market under the MMPR regime will grow large enough to support a competitive industry.

12. The profit that a firm earns from selling medical marijuana depends on the difference between the price charged and its average production costs. For reasons that I spell out below, in section 4.2, I expect average production costs of Licensed Producers to fall over time. It follows, then, that the price charged must fall over time as well. If not, then firms will enjoy above-normal profits and that will lead to price competition.

4.1 Reasons that the legal market for medical marijuana will grow over time.

13. Predictions about trends in the size of a new market are always uncertain, but the evidence suggests that the market for legal medical marijuana will grow in size over time. In particular, I note that:

The potential size of the new market is large.

14. The number of Canadians 25 years and older who report using marijuana for medical purposes is approximately 500,000. I obtained this estimate from the Canadian Alcohol and Drug Use Monitoring Survey (CADUMS), a nationally representative survey of Canadians commissioned by Health Canada. In particular, according to the 2012 CADUMS, 10.25% of Canadians 25 years and older (2,828,277) use cannabis. The 2012 CADUMS did not ask subjects about the use of marijuana for medical purposes. This question was asked, however, in the 2011 CADUMS; in 2011, 17.7% of marijuana users reported doing so for medical purposes.[2] Assuming that this 17.7% fraction applies to 2012, it follows that about 500,000 (17.7% of 2,828,277) Canadians 25 years and older use marijuana for medical purposes.

15. The number of medical marijuana users licensed under Health Canada's medical marijuana regulatory regime has been growing markedly. This is clear from Figure 1 below, which reports the number of licensed medical marijuana users (those who hold an "Authorization to Possess" dried marijuana in Canada certificate) by year from January 2003 to January 2012. The latest figures

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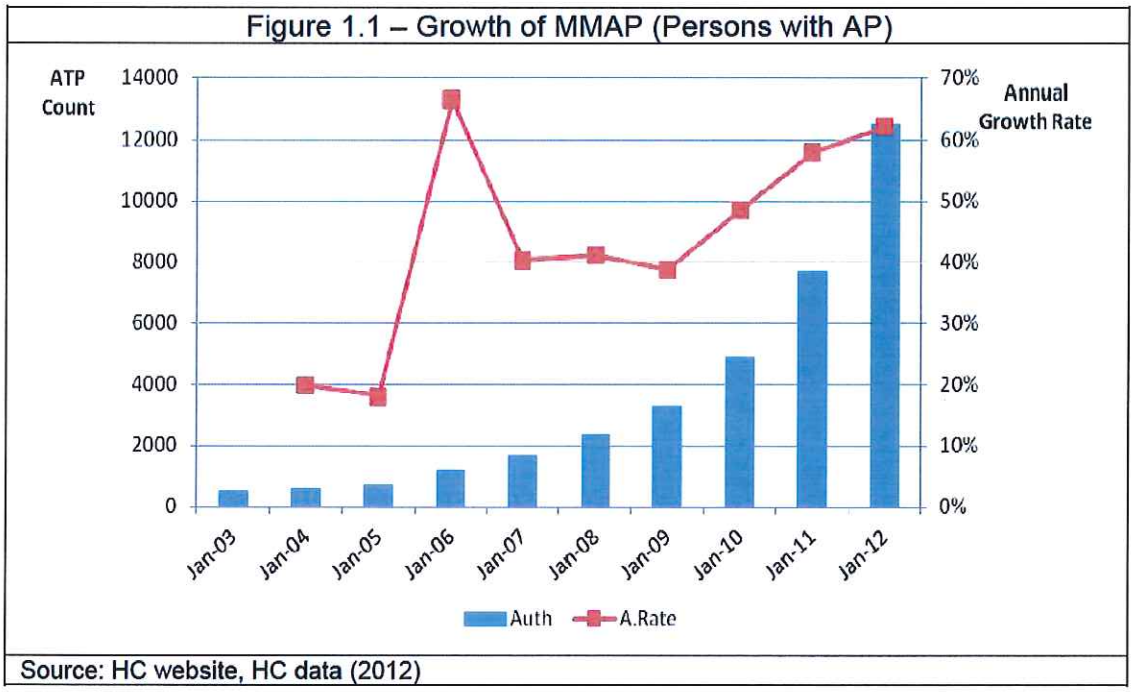
[1] http://www.hc-sc.gc.ca/dhp-mps/marihuana/info/list-eng.php (Accessed February 3, 2014)

[2] See: Canadian Alcohol and Drug Use Monitoring Survey. Summary of Results for 2011. *http://www.hc-sc.gc.ca/hc-ps/drugs-drogues/stat/_2011/summary-sommaire-eng.php* (Accessed February 3, 2014)

reported on the Health Canada website (those for December 2012) indicate that there are 28,115 licensed users, more than double the numbers reported for January 2012. Counsel for the Attorney General advises me that there were 36,797 licensed users in 2013.

16. Health Canada predicts that, based on the historical growth rates on the licensed medical marijuana users, the number of medical marijuana users in Canada will increase to 300,000-400,000 users by 2022.[3]

Figure 1. Number of licensed medical marijuana users by year from January 2003 to January 2012.



Note: number of users indicated by blue bars; annual growth rate indicated by the red line. Source: Stambrook D, Ireland D, Xie W. *Cost-Benefit Analysis of Regulatory Changes for Access to Marihuana for Medical Purposes.* Report prepared for Health Canada by Delsys Research Group Inc., December 2012. Page 16.

Under the MMPR, patients will have an easier time obtaining authorization to use medical marijuana.

17. In the Regulatory Impact Analysis Statement that accompanies the MMPR,[4] Health Canada notes that under the new regulations, medical marijuana

[3] http://gazette.gc.ca/rp-pr/p1/2012/2012-12-15/html/reg4-eng.html (Accessed February 3, 2014)

users will no longer require both a prescription from an authorized prescriber and a Health Canada "Authorization to Possess" (ATP) dried marijuana in Canada certificate. Instead, they require just a prescription from an authorized prescriber. Obtaining an ATP under the previous regulatory regime was a non-trivial undertaking. It involved a fair amount of paperwork and up to 10 weeks processing time by Health Canada. Elimination of the ATP requirement should thus facilitate user access to medical marijuana.

18. The set of authorized prescribers is expanded under the MMPR to include both licensed physicians and nurse practitioners. This should facilitate patient access to legal medical marijuana once the new regulations come into effect. Moreover, the Regulatory Impact Analysis Statement notes that the proposed MMPR do not include categories of symptoms and conditions, and there would no longer be a requirement for some individuals to obtain the support of a specialist in addition to that of their primary care physician in order to access marijuana for medical purposes.

19. The administrative burden on prescribers is also lower under the new regulations and this will likely increase their willingness to prescribe medical marijuana. In the same Regulatory Impact Analysis Statement,[5] Health Canada notes:

> "Under the current MMAR [i.e. the current regulations], physicians who sign medical declarations must sign a statement indicating they are aware that no notice of compliance has been issued under the FDR relating to the safety or effectiveness of dried marihuana, as well as a statement indicating that conventional treatments have been tried or considered and are ineffective or medically inappropriate. The proposed MMPR do not require authorized health care practitioners to make specific declarations with respect to the use of marihuana for medical purposes, the effectiveness or appropriateness of other therapies, or the regulatory status of marihuana. This is expected to reduce the complexity of the physician's role in access to marihuana for medical purposes."

Patients may prefer to obtain marijuana from Licensed Producers instead of marijuana supplied by unauthorized producers.

20. After the MMPR come into full force, only Licensed Producers will be legally permitted to supply medical marijuana, and the price of medical marijuana from Licensed Producers may well be lower than that from illegal

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[4] http://gazette.gc.ca/rp-pr/p1/2012/2012-12-15/html/reg4-eng.html (Accessed February 3, 2014)

[5] Marihuana for Medical Purposes Regulations. Regulatory Impact Analysis Statement. *Canada Gazette* Vol. 146, No. 50 — December 15, 2012. http://gazette.gc.ca/rp-pr/p1/2012/2012-12-15/html/reg4-eng.html. (Accessed February 3, 2014.)

producers. The reason is that Licensed Producers will not face two costs that illegal producers will face. First, illegal producers face the risk of criminal prosecution and the expected penalties need to be incorporated into the price for the illegal operation to be profitable. Second, illegal producers need to produce in a manner and on a scale that avoids detection. Licensed Producers are not so encumbered and can therefore face lower unit production costs.

21. Licensed Producers also may have a quality advantage over illegal supply: Licensed Producers' production facilities must meet "Good Production Practices" requirements, and the potency of the medical marijuana, both delta-9-tetrahydrocannabinol ("THC") and cannabidiol, must be clearly labeled. The Good Production Practices, outlined on the Health Canada website,[6] regulate, *inter alia*, microbial and chemical contaminants of dried marijuana, and acceptable residual levels of pest control products. Medical marijuana sold by Licensed Producers will also be available for purchase on-line making it perhaps more accessible to patients than the illegal product.

22. In addition to their production quality and price advantages, Licensed Producers may also attract patients on the basis of the diversity of their product offerings. As the market matures, Licensed Producers will likely compete by offering new combinations of levels of potency of THC, cannabidiol and genetic strains. One Licensed Producer, Tweed Inc., for instance, advertises the following on its website:

> "How many strains of medical marijuana will Tweed be selling?
>
> Tweed will provide its customers with at least 25 different strains to choose from. We will also provide a wide variety of information and support to assist patients in finding the strain that meets their personal needs."[7]

Drug plan subsidies for medical marijuana

23. The Department of Veterans Affairs covers the cost of prescription medications for Canadian veterans. This drug plan covers medical marijuana despite the fact that it is not a prescription medicine.[8] This should facilitate access to plan beneficiaries. Given this precedent, it seems plausible that other drug plans will extend coverage for medical marijuana as well, thereby improving patient access and the size of the market.

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[6] http://www.hc-sc.gc.ca/dhp-mps/marihuana/info/techni-eng.php (Accessed February 3, 2014)

[7] http://www.tweed.com/pages/frequently-asked-questions (Accessed February 3, 2014)

[8] $1.3B medical marijuana free market coming to Canada. CBC News, September 29, 2013. http://www.cbc.ca/m/touch/news/story/1.1872652. (Accessed February 3, 2014)

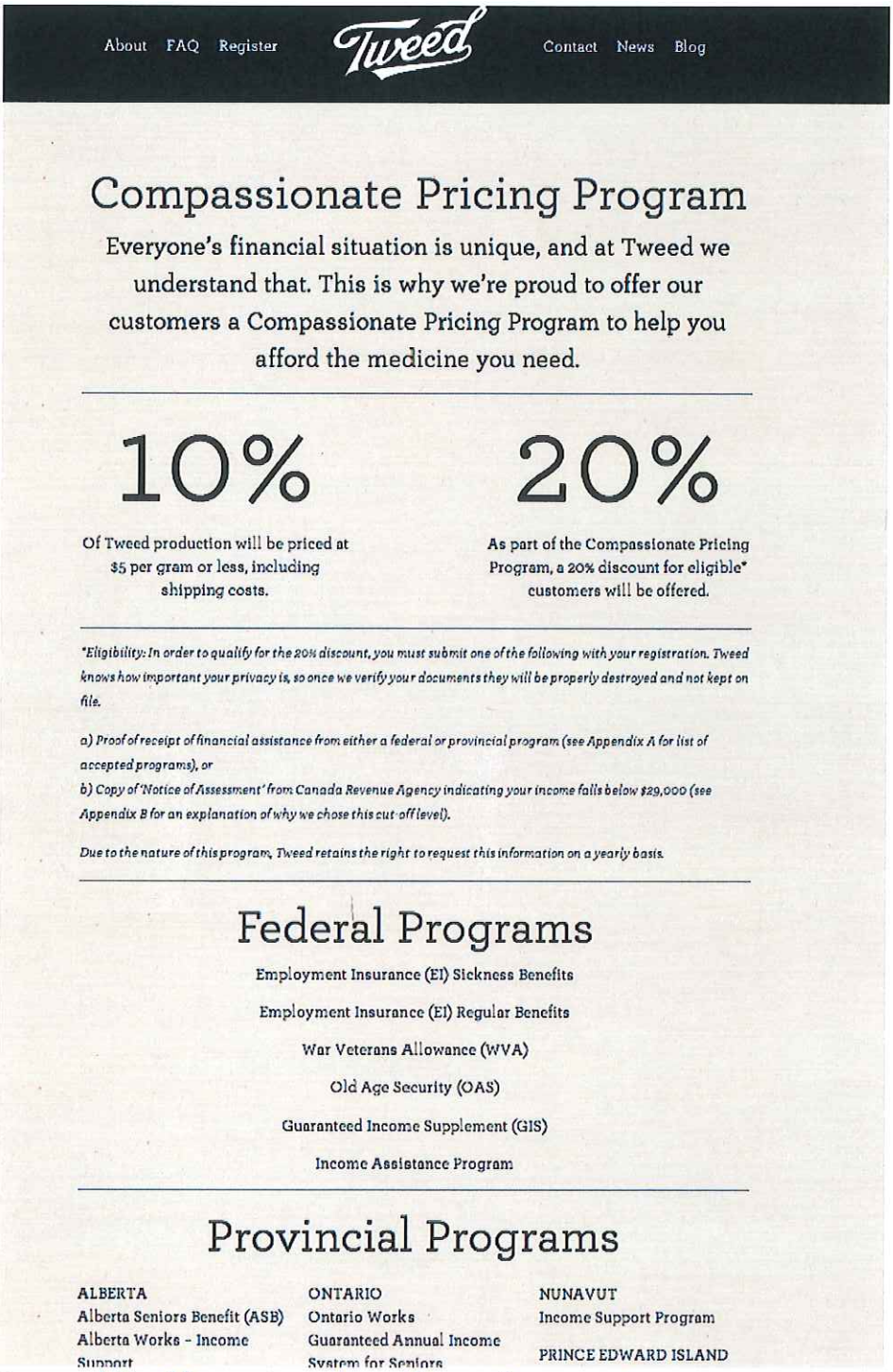
Lower prices for low income medical marijuana users

24. Businesses routinely charge consumers different prices, on the basis of the consumer's willingness and ability to pay. For instance, some movie theatres offer seniors discounted prices on tickets. This "price discrimination" is possible if the business can distinguish the willingness to pay ("WTP") of its potential customers. Suppose that there are two identifiable types of consumers: those with high WTP and those with low WTP. Price discrimination is profitable if two conditions hold: a) the low WTP consumers are unwilling to purchase at the standard price but are willing to pay enough to cover the cost of providing the good or service; and b) the good or service cannot be easily resold (otherwise the business runs the risk that low WTP consumers purchase at the discounted price and then resell to high WTP consumers).

25. Price discrimination has the effect of increasing the size of the market: it permits sales to low WTP consumers, who otherwise would be excluded from the market.

26. I would expect to see Licensed Producers of medical marijuana engage in price discrimination, given that this appears to be a profitable strategy in this market. First, consumers can be distinguished by their ability to pay; for instance, a producer can request from low WTP consumers proof of low income status. Second, given that the resale of prescription medical marijuana is illegal, I would not expect a large resale market to emerge.

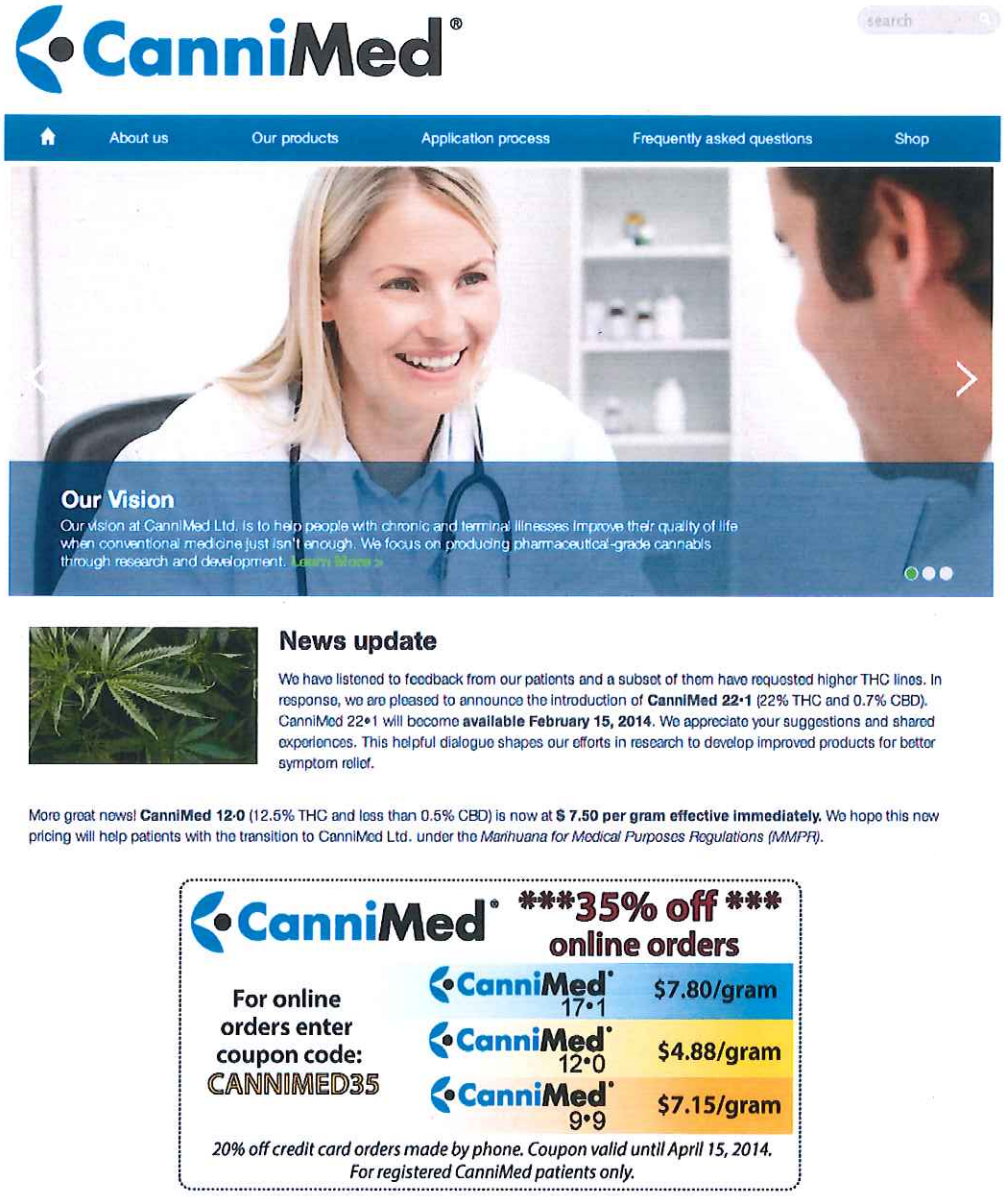
27. There is already evidence that Licensed Producers will charge lower prices to those with lower income. One Licensed Producer, Tweed Inc., indicates on its website that it will offer a price reduction of 20% to those who can demonstrate low income status. An image of the website is displayed below.



Source: http://www.tweed.com/pages/compassion-program (Accessed February 3, 2014)

28. Businesses can also price discriminate using time-limited promotions, or sales, which are offered to all customers. The idea is that these sales tend to attract customers who are willing to time purchases to coincide with sale dates but are otherwise unwilling to pay the full price. Customers who are willing to wait for sales tend to be lower income; those unwilling to do so tend to be higher income.

29. There is some evidence that Licensed Producers will engage in this strategy. One Licensed Producer, CanniMed, indicates on its website that it will offer a 35% discount on select varieties of its marijuana for a limited time. An image of the website is displayed below.



Source: http://cannimed.ca/ (Accessed February 3, 2014)

Health Canada has received many applications from firms seeking approval to be a Licensed Producer.

30. Counsel for the Attorney General of Canada has informed me that as of February 3, 2014, Health Canada has received 418 Licensed Producer applications. Counsel for the Attorney General of Canada has also informed me that Health Canada receives 25 applications from firms wishing to be Licensed Producers each week on average. This suggests that many firms believe that the market will be large.

31. Thus, in summary, I note that there are several pieces of evidence that, when taken together, suggest that the market for legal, commercially-sourced medical marijuana will be large. In particular, survey data and Health Canada estimates suggests the potential size of the new market is at least 300,000 users; the number of medical marijuana users licensed under the MMPR has been growing markedly; under the MMPR, patients will have an easier time obtaining authorization to use medical marijuana than under the existing regulatory regime; patients may prefer to obtain marijuana from Licensed Producers instead of marijuana supplied by unauthorized producers; at least one drug plan has provided subsidies for medical marijuana; Licensed Producers will offer lower prices to lower income consumers; and, finally, Health Canada has received over 400 applications from firms seeking approval to be a Licensed Producer, and this indicates that many firms believe that the market will be large.

4.2. Reasons for lower medical marijuana average production costs over time

Reason #1 Learning by doing.

32. The legal medical marijuana industry is still in its infancy. As of February 3, 2014, there were only 6 firms selling medical marijuana to patients (or registering patients) and I expect sales volumes are low.[9] Over time, as production expands, producers will gain expertise in the production and distribution of medical marijuana. Through a process of experimentation, trial and error, and knowledge sharing, producers will better understand the various facets of medical marijuana cultivation, harvest, and processing. This includes, for instance, which strains of medical marijuana to grow, which fertilizers to use, how much to use and when to use. Producers will better understand how to manage mold, mildew and pests. Producers will be better able to assess which combination of human resources (i.e. the number of employees with a particular skill set) and equipment (such as automated irrigation, ventilation, air conditioning and artificial lighting systems) to use. Producers will be better able to meet the reporting, record keeping and other administrative requirements set

[9] List of Authorised Licensed Producers under the Marihuana for Medical Purposes Regulations. Health Canada website. Accessed February 3, 2014. http://www.hc-sc.gc.ca/dhp-mps/marihuana/info/list-eng.php

out under the proposed MMPR. These gains in expertise will translate into greater yields and lower costs per kilogram grown.

Reason #2 Lower prices for skilled labour.

33. One component of the cost of medical marijuana production is the compensation (wages and benefits) paid to skilled medical marijuana growers. Because the industry is in its early stages, relatively few individuals in Canada have the skills required to grow medical marijuana at a commercial scale. Given their small numbers, such individuals can command premium wages. This has been the experience of marijuana growers in Colorado, a state that has legalized marijuana production for general use. A recent article in *Slate* magazine profiled the experience of one marijuana grower:

> "But looking at Brandon's books, it becomes clear that, so far at least, nearly all the money coming in the door is going right back out in expenses. Like many Colorado dispensary operators, he's faced major, expensive problems with his grow facilities. He's gone through five grow managers in four years, as top-notch growers who don't already have lucrative, stable jobs are hard to come by."[10]

34. As the industry matures and production grows, more individuals will acquire expertise in growing medical marijuana. This should increase the pool of skilled labour and decrease wages, thereby lowering production costs.

Reason #3 Economies of scale.

35. For reasons that I have already spelled out, I expect the market for medical marijuana to grow over time. An expansion in the size of the market will allow commercial growers to expand production capacity as well. Doing so will allow them to exploit so-called "economies of scale". Economies of scale are reductions in average per unit production costs that occur when fixed production costs are spread out over a larger production volume. Fixed production costs are those that are incurred regardless of the size of the production volume. The cost of implementing an on-line ordering system is independent of sales volume. Thus the average cost per on-line sale decreases with the number of sales. The cost of obtaining Health Canada approval to become a Licensed Producer is another example of a fixed cost.

36. Variable costs are those that vary with the scale of operation. Some variable costs increase slower than production volume, thereby conferring another cost advantage to larger scale. In other words, the cost of producing a kilogram of medical marijuana can be lower the greater is production volume.

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[10] Kamin S, Warner J. Dime Store. *Slate Magazine*. January 16 2014. http://www.slate.com/articles/news_and_politics/altered_state/2014/01/colorado_marijuana_legalization_how_lucrative_is_it_to_be_a_legal_weed_dealer.html. Accessed February 3, 2014.

This is known as declining marginal cost. For instance, higher volumes permit productivity gains from labor specialization (with a higher output, workers can specialize more narrowly on specific tasks). The cost of installing a security system undoubtedly increases with the amount of medical marijuana produced, but the increase in cost is likely not proportional to the increase in volume. In particular, suppose a greenhouse is outfitted with security cameras on all of its 4 entrance points. Suppose, next, that the greenhouse growing capacity is doubled. As long as there are fewer than 8 entrance points in the new greenhouse, the security camera cost per kilogram of medical marijuana produced decreases with the larger scale.

37. It should be noted that while economies of scale in indoor medical marijuana production do exist, the literature suggests that they are modest. In particular, a recent review article concluded that:

> "Our estimates suggest that the economies of scale for the indoor production of marijuana are modest. The economies of scale for greenhouse growing are larger than for indoor growing, but even these are relatively mild. This conclusion was reinforced in the perspectives we solicited from growers responding to our cost-of-production survey. The growers surveyed were of the opinion that there would be some unit cost advantages to increasing the size of their operations (in particular they referenced quantity discounts on inputs), but that the gains would not be substantial. Only one-third of the respondents were of the opinion that they would enjoy substantial reductions in costs if they were to substantially increase the scale of their operations."[11]

Reason #4 Technological innovation.

38. As medical marijuana production increases and the industry matures I would expect to see innovation in marijuana growing technology as producers seek ways to lower their operating costs and/or increase yields. Conducting research is costly but if market size is sufficiently large, then such innovation can be profitable because the R&D costs are amortized over a large sales volume.

39. Such technological innovation is common in agriculture. For instance, the diffusion of new technologies, particularly the development of new varieties of seeds, has dramatically increased yields of rice, wheat, maize, and other crops since the mid 1960s (see Figure 2). The medical marijuana industry should also

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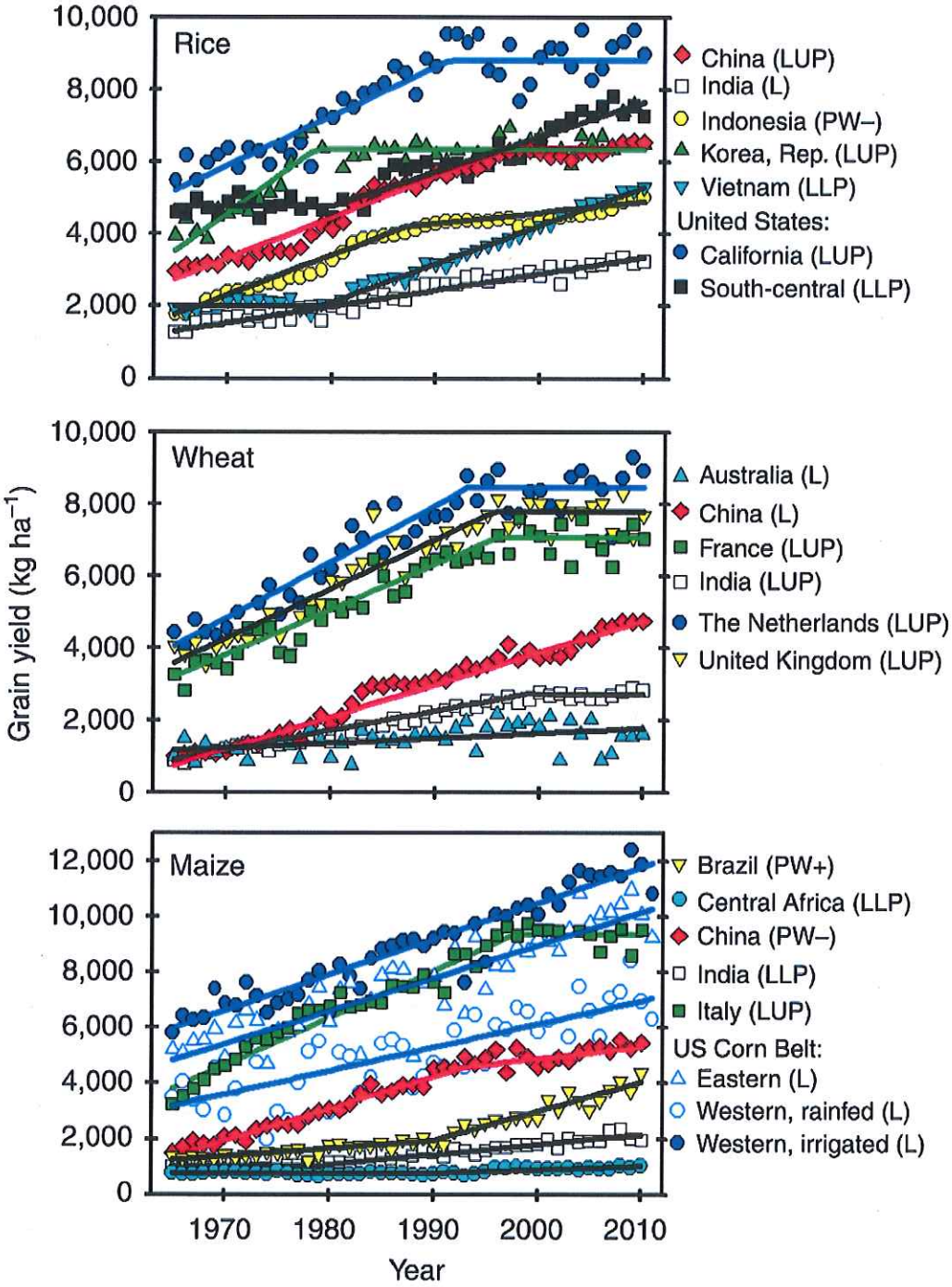
[11] Hawken A, Prieger J. *Economies of Scale in the Production of Cannabis*. Botec Analysis Corporation. Report prepared for the Washington State Liquor Control Board, October 22, 2013. Available at: http://liq.wa.gov/publications/Marijuana/BOTEC%20reports/5c_Economies_Scale_Production_Cannabis_Oct-22-2013.pdf (Accessed February 3, 2014).

benefit from technological advance as commercial scale operations develop in Canada and in other jurisdictions as well.

Figure 2 Trends in agricultural yields, by country and crop (rice, wheat and maize)



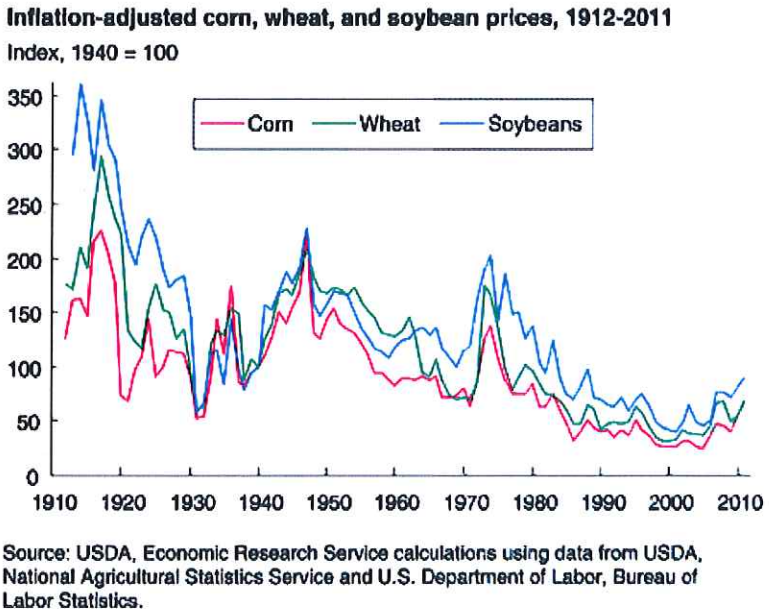
Source: http://www.readcube.com/articles/10.1038%2Fncomms3918 (Accessed February 3, 2014)

4.3 Empirical evidence on the reduction in prices charged over time in the early years of a competitive industry.

40. I have argued that the price of legally-sourced medical marijuana should decline over time provided that the market grows in size. A growing market permits entry of many firms which, in turn, disciplines firms to charge the lowest feasible prices; a growing market also encourages firms to seek out lower cost ways of production. This argument is supported by evidence from prices charged over time in the early years of two competitive industries – the agricultural industry and the automobile industry.

41. Turning first to the agricultural industry, Figure 3, below, displays a graph of the inflation-adjusted prices for corn, wheat, and soybeans in the US, over the period 1912-2011. The first part of this period marks the rapid industrialization of the agricultural sector in the US and a period of falling prices that reflects the reduction in cost per ton produced. Over the long term, prices have trended downwards.

Figure 3. Inflation-adjusted prices for corn, wheat, and soybeans in the United States, 1912-2011.



Data source: Economic Research Service, US Department of Agriculture

http://www.ers.usda.gov/data-products/chart-gallery/detail.aspx?chartId=40093#.Ut7Yy2Qo6Xo (Accessed February 3, 2014)

42. The same pattern of falling inflation-adjusted prices is observed for the US automobile industry in its early years (Figure 4, below).

Figure 4. Inflation- and quality-adjusted prices for new automobiles in the United States, 1906-1982.

91 Quality-Adjusted Automobile Prices

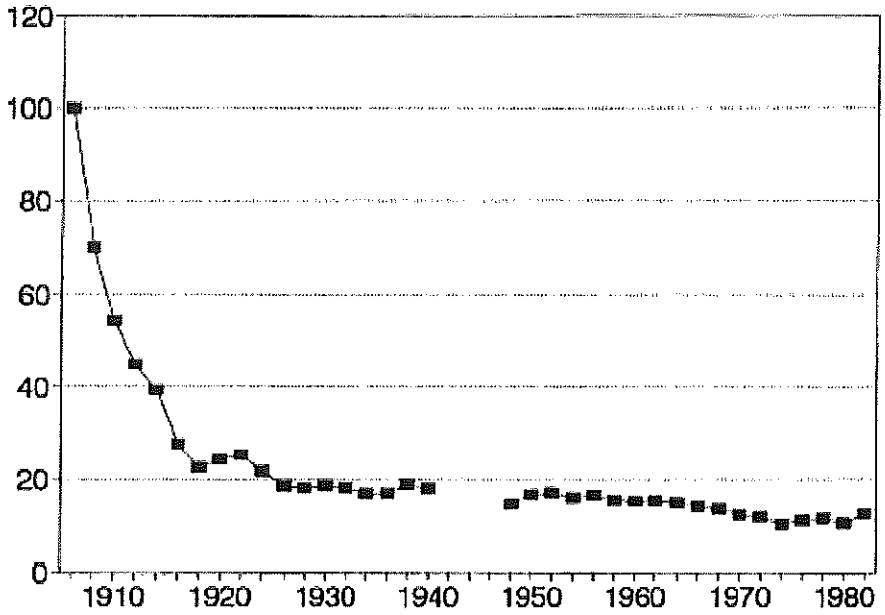


Fig. 2.4 Quality-adjusted price index 1906–1982 deflated by the Consumer Price Index (1906=100)

Source: Daniel M. G. Raff, Manuel Trajtenberg. Quality-Adjusted Prices for the American Automobile Industry: 1906-1940. In *The Economics of New Goods*, Timothy Breshnahan and Robert Gordon, eds. National Bureau of Economic Research Studies in Income and Wealth, 1996, page 91.

Issue #2

43. On the second issue, should medical marijuana users be exempt from the requirement under the MMPR regime to purchase their medical marijuana from Licensed Producers or Health Canada, then the size of the legal market for medical marijuana will be smaller than otherwise. A smaller legal market will support fewer Licensed Producers of medical marijuana. Fewer Licensed Producers will reduce the degree of price competition and cost-reducing technological innovation in medical marijuana production. Both of these factors should moderate price declines over time.

44. The rate of decline of prices of medical marijuana charged by Licensed Producers in the scenario being contemplated (in which medical marijuana users are exempt from the requirement under the MMPR regime to purchase their medical marijuana from Licensed Producers or Health Canada) depends on the fraction of users who do not procure their medical marijuana from Licensed Producers or Health Canada. There are several possible outcomes:

a) Possibility #1: If this fraction is small, then prices of commercially-sourced medical marijuana will continue to decline over time but not at the same rate that would obtain should users be required to purchase their medical marijuana from Licensed Producers or Health Canada.

b) Possibility #2: If the fraction of medical marijuana users who do not procure their medical marijuana from Licensed Producers or Health Canada is sufficiently high, then it is possible that commercially-sourced medical marijuana prices will increase over time. This would occur if the legal market shrank in size over time, causing Licensed Producers to exit the industry. The reductions in competitive pressure caused by the exit of firms may lead to prices growing over time

c) Possibility #3: If the fraction of medical marijuana users who procure their medical marijuana from Licensed Producers or Health Canada is very low then, it remains a possibility that, under this scenario, there will be no Licensed Producers producing medical marijuana. This would occur if the market were too small to support even one Licensed Producer.

45. I have no information on the probabilities of each of these three scenarios.

P Grootendorst

Paul Grootendorst

Feb. 5, 2014

Date

Department of Justice
Canada

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January 24, 2014

By Email to paul.grootendorst@gmail.com

Dr. Paul Grootendorst
Faculty of Pharmacy
University of Toronto
144 College Street, Room 601
Toronto, ON M5S 3M2

Dear Dr. Grootendorst:

Re: ***Allard et al. v. Her Majesty the Queen in Right of Canada***
Instruction Letter

Thank you for agreeing to provide the Attorney General of Canada ("AGC") with an expert report in the matter of *Allard et al. v. Her Majesty the Queen in Right of Canada*. As discussed, this Federal Court litigation involves a constitutional challenge to the *Marihuana for Medical Purposes Regulations* (the "Regulations").

Background Information

The plaintiffs in this litigation, all of whom are medical marihuana users, seek to strike down, among other things, the section of the Regulations that requires medical marihuana users to purchase their medical marihuana from a licensed producer or from Health Canada. The plaintiffs prefer the prior regime in which they were permitted to grow their own medical marihuana or designate another person as their grower. One aspect of the plaintiffs' claim is their contention that the current Regulations will make the cost of their medical marihuana prohibitive and they will, thereby, be deprived reasonable access to their medical marihuana in violation of their rights under the *Charter of Rights and Freedoms*.

The plaintiffs have also indicated that they will seek an injunction from the Court that would permit them to continue under the rules of the old regime (ie. they would be able to continue growing their own medical marihuana) until the constitutionality of the present Regulations is decided by the Court.

The AGC is the defendant and it is the AGC's position that the current Regulations are constitutionally sound, a position that will be defended by legal counsel on behalf of the AGC.

Facts and Assumptions

The facts alleged by the plaintiffs are outlined in the Amended Notice of Civil Claim which is enclosed.

Questions for Your Expert Report

Please address the following matters in your expert report:

1. Discuss the marketplace trend(s) with respect to the price of medical marihuana that you would expect to see under the Marihuana for Medical Purposes Regulations;

2. Discuss the impact(s) on the regime created by the Marihuana for Medical Purposes Regulations and, in particular, the impact(s) on Licensed Producers and the cost of medical marihuana, if medical marihuana users were exempt from the requirement under the regime to purchase their medical marihuana from Licensed Producers or Health Canada.

Format of Your Expert Report

Your report must be prepared in accordance with the Federal Courts Rules. As such, we ask that you do the following in within the body of your report:

1. Set out the issues to be addressed in the report;
2. Describe your qualifications on the issues to be addressed;
3. Attach your current curriculum vitae as a schedule to the report;
4. Attach this letter of instruction as a schedule to the report;
5. Provide a summary of your opinions on the issues addressed in the report;
6. Set out the reasons for each opinion that is expressed in the report;
7. Attach any literature or other materials specifically relied on in support of the opinions;
8. If applicable, provide a summary of the methodology used in the report;
9. Set out any caveats or qualifications necessary to render the report complete and accurate, including those relating to any insufficiency of data or research and an indication of any matters that fall outside of your field of expertise; and,
10. Particulars of any aspect of your relationship with a party to the proceeding or the subject matter of your report that might affect your duty to the Court.

Please number each paragraph of your report as this will aid us in referring to your report in Court.

Please sign and date your report.

Duty to the Court

As an expert witness, you have a duty to the Court which is set out in the attached Code of Conduct for Expert Witnesses. Please carefully review this Code of Conduct and, after doing so, sign the attached Certificate and send it back to us.

Hearing Dates and Procedural Matters

We anticipate that the AGC's evidence with respect to the plaintiffs' injunction request will be due sometime in mid-February and that the Court will hear the injunction application sometime in mid-March. It is anticipated that the plaintiffs will have an opportunity to cross-examine you sometime in late February or early March. If the plaintiffs request cross-examination, we would work around your availability to the extent possible. If your testimony is also required for the trial itself, we will let you know as soon as possible. No dates have been set for the trial.

Please keep all correspondence pertaining to this assignment in a separate "Expert Witness Report" folder.

We look forward to discussing your report with you the week of January 27, 2014. Please do not hesitate to contact me by telephone at 604-666-4304 or my colleague, Toireasa Jespersen, at 604-666-4315 if you require further information or have questions regarding the foregoing.

Yours truly,

BJ Wray
Counsel

Enclosures: Certificate for Expert Witnesses; Code of Conduct for Expert Witnesses; Amended Notice of Civil Claim

Paul Vincent GROOTENDORST
DOB: July 28, 1966, Victoria, BC, Canada
http://individual.utoronto.ca/grootendorst/

1 Education

- **PhD (economics)** McMaster University, Hamilton ON (1995)
  PhD thesis: *Effects of drug plan eligibility on prescription drug utilization among Ontario and British Columbia seniors.* Supervisor: Martin Browning
- **MA (economics)** Queen's University, Kingston ON (1990)
  MA thesis: *Evidence of supplier induced demand for medical care in British Columbia.* Supervisor: Charles Beach
- **BA (honours economics)** University of Victoria, Victoria BC (1988)

2 Employment History

- **Associate Professor** (tenured), Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto ON (2002-10/present)
- **Assistant Professor**, Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton ON (1996-10/2002-09)
- **Post-Doctoral Fellow**, Centre for Evaluation of Medicines, St. Joseph's Hospital, Hamilton ON (1995-07/1996-09)
- **Consultant**, British Columbia Ministry of Health (Pharmacare, Health Promotion and Health Economics divisions), Victoria BC (1992-06/08, 1991-06/08, 1990-06/08)

3 Awards received

- Award for best paper published in *Pharmacoepidemiology and Drug Safety* in 2011 (shared with J Leombruno, GC Nguyen, D Juurlink, T Einarson).
- John Vanderkamp Prize for the best paper published in *Canadian Public Policy* in 2005 (shared with M Veall) (2006-06)
- Premier's Research Excellence Award (2003-09)
- Rx & D Health Research Foundation – Canadian Institutes of Health Research *Research Career Award in Health Sciences* (2000-07/2005-06)
- Canadian Institutes of Health Research / Social Sciences and Humanities Research Council / National Health Research and Development Program *New Investigator Career Award* (2000-07/2005-06) (declined)

4 Present Appointments

- **Director**, Division of Social and Administrative Pharmacy, Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto ON (2008-09/present)
- **Associate Professor** (tenured), Leslie Dan Faculty of Pharmacy, and School of Public Policy and Governance, University of Toronto
- **Adjunct Professor**, Department of Economics, McMaster University, Hamilton ON

5 Research Awards

5.1 Under review

Project title:	Finding the threshold: the relationship between health expenditures and health outcomes in Ontario
P. Investigators:	Krahn M
Co-investigators:	Coyte P, Grootendorst P, 4 others
Funding agency:	CIHR Operating Grant (2012-09-17)
Funding period:	2013-03/2015-02
Total funding requested:	$300,000

Project title:	Making competition work in pharmaceutical markets
P. Investigators:	Hollis A, Grootendorst P
Funding agency:	CIHR Operating Grant (2013-03-15)
Funding period:	2013-10/2017-09
Total funding requested:	$257,256

5.2 Grants awarded

Project title:	Developing Effective Policies for Managing Technologies for Rare Diseases
P. Investigator:	Menon D
Co-investigators:	Hollis A, **Grootendorst P**, 29 others
Funding agency:	CIHR Emerging Team Grant: Rare Diseases (2011-08-15)
Funding period:	2012-02/2016-01
Total funding:	$1,182,569

Project title:	LOI Grant: Alternatives and supplements to patents for pharmaceutical innovation: A multi-disciplinary exploration of alternatives
P. Investigator:	Hollis A, **Grootendorst P**
Co-investigators:	Chit A, Edwards A, Kohler J, Levine DK, Nguyen TKC, Pogge T, Ware A, Willan A
Funding agency:	CIHR Programmatic grants in health and health equity
Funding period:	2010-12/2011-03
Total funding:	$15,000
Brief description:	We develop a protocol to assess the feasibility of using both push and pull incentives to spur pharmaceutical innovation for diseases prevalent in both developed and developing regions.

Project title:	Health Technologies as a Cost-Driver in Canada
P. Investigator:	**Grootendorst P**, Nguyen H
Co-investigators:	Shim MS
Funding agency:	Strategic Policy Branch, Office of Pharmaceuticals Management Strategies, Health Canada
Funding period:	2011-01/2011-06
Total funding:	$62,659
Brief description:	We estimate the effect of health care technologies on health care costs in Canada.

Project title:	Dental services coverage for Canada's aging population
P. Investigator:	**Grootendorst P**, Quiñonez C
Co-investigators:	Nguyen H
Funding agency:	CIHR Pilot Projects in Aging 2010-09-30
Funding period:	2011-03/2012-02
Total funding:	$49,900
Brief description:	The provision of dental care for the growing ranks of retired Canadians has emerged as an important health policy issue. We use data from various surveys from Statistics Canada to estimate (i) the fraction of Canadian households who will retain employer provided coverage into retirement; and (ii) of those without post retirement benefits, the fraction of seniors who will have difficulty affording dental care services. We also investigate the implications of affordability on retirees' use of dental care services and ultimately, their dental health.

Project title:	Managing pharmaceutical expenditure: An overview and options for Canada
P. Investigator:	**Grootendorst P**, Hollis A
Funding agency:	Canadian Health Services Research Foundation
Funding period:	2010-08/2010-11
Total funding:	$18,000
Brief description:	We review novel approaches to resolving competing objectives in pharmaceutical drug policy: innovation, access and financial sustainability.

Project title:	Economic Policy, Obesity and Health: A Scoping Review
P. Investigator:	Falkner G, **Grootendorst P**
Co-investigators:	Ferrence R, Mendelson R, Donnelly P, Arbour K
Funding agency:	Heart and Stroke Foundation
Funding period:	2009-07/2010-06
Total funding:	$100,000
Brief description:	We survey the literature and consult with experts re: the use of financial incentives to curb obesity.

Project title:	Assessment of the cost and equity of different catastrophic drug insurance options for Canadians
P. Investigator:	**Grootendorst P**
Co-investigators:	Racine JS
Funding agency:	CIHR Operating Grant
Funding period:	2008-07/2010-06
Total funding:	$238,677
Brief description:	We assess the ability of different forms of national drug insurance to insulate Canadians against potentially ruinous drug costs.

Project title:	The cost-effectiveness of cancer drugs: Providing evidence of the value of medicines in delivering expected outcomes
P. Investigators:	Hoch J, Krahn M
Co-investigators:	Bell C, Gavura S, **Grootendorst P**, Hodgson D, Mamdani M, Peacock S, Sawka C, Sullivan T, Trudeau M, Woodward G
Funding agency:	Drug Innovation Fund of the Ontario Ministry of Health and Long Term Care
Funding period:	2008-04/2011-03
Total funding:	$468,461 (=$156,154 p.a.)
Brief description:	Using longitudinal administrative claims data, we assess the cost, effectiveness and cost-effectiveness of several cancer drugs currently covered by the Ontario government.

Project title:	Implementation of the Low Risk Ankle Rule
P. Investigator:	Boutis K
Co-investigators:	**Grootendorst P**, Grimshaw J, Goeree R, Schuh S, Plint A, Johnson D, Babyn P, Narayanan U, Stephens D, Sayal A, Butler N
Funding agency:	PSI
Funding period:	2008-11 to 2010-10
Total funding:	$161,000
Brief description:	A knowledge translation study will evaluate an implementation strategy that promotes the use of a validated paediatric ankle x-ray decision rule, the Low Risk Ankle Rule (LRAR). The effectiveness and safety of the LRAR on important clinical and health care utilization outcomes will be assessed.

Project title:	Return on investment from pharmaceutical care: Measuring population-based causes and consequences of prescription drug utilization and expenditure
P. Investigator:	Morgan SG
Co-investigators:	Barer ML, Bassett KL, Black C, Dormuth CR, Evans RG, **Grootendorst P**, Mintzes BJ, Stukel TA, Wright JM
Funding agency:	CIHR Operating Grant MOP 84390
Funding period:	2007-07/2010-06
Total funding:	$513,965 (=$171,322 p.a.)
Brief description:	Using linked, patient level records describing the use and cost of pharmaceuticals, medical services, and hospital care by all British Columbians over the period of 1996 to 2007 we will estimate the effect of pharmaceuticals use on health services use and population health.

Project title:	A refined catastrophic drug coverage costing methodology
P. Investigator:	**Grootendorst P**
Funding agency:	Health Canada Project # 0020061930
Funding period:	2007-05/2007-06
Total funding:	$75,000
Brief description:	I propose methods to estimate the cost of a proposed federally funded catastrophic drug plan in Canada.

Project title:	Effects of 'authorized-generics' on Canadian drug prices
P. Investigator:	**Grootendorst P**
Funding agency:	Industry Canada/Competition Bureau Project # 8003191
Funding period:	2006-07/2007-05
Total funding:	$20,000
Brief description:	I assess whether authorized-generics (generic drugs released by brand drug companies) are anti-competitive.

Project title:	Liquid-Based Techniques for Cervical Cancer Screening
P. Investigator:	Krahn M
Co-investigators:	Rosen B, McLachlin M, Sanders B, **Grootendorst P**, Tomlinson G, Pham B
Funding agency:	CCOHTA Project # 05-P-H0333
Funding period:	2006-02/2007-10
Total funding:	$61,600 (≈ $35,200 p.a.)
Brief description:	We conduct an economic appraisal of the use of liquid-based cytology for cervical cancer screening.

Project title:	Social and Economic Dimensions of an Aging Population (SEDAP II) – Canada in the 21st Century: Moving Towards an Older Society
P. Investigator:	Spencer B.
Co-investigators:	**Grootendorst P** and others listed on http://socserv.socsci.mcmaster.ca/sedap/teamII.htm
Funding agency:	SSHRC 2004 Major Collaborative Research Initiatives [grant 412-2004-1006]
Funding period:	2005-2010
Total funding:	$2,498,047 (≈ $500,000 p.a.)
Brief description:	Using a variety of data sources and methods we explore the implications of population aging and immigration on the health services use and health of Canadians.

Project title: Dynamics in prescription drug cost sharing and use of prescription drug use: analysis using the longitudinal 2000-01 National Population Health Survey.
P. Investigator: **Grootendorst P.**
Co-investigators: Levine MAH, Veall MR
Funding agency: Canadian Institutes for Health Research [grant 57803]
Funding period: 2002-10/2003-09
Total funding: $89,771
Brief description: Using individual-level data from the longitudinal 2000-01 National Population Health Survey, we examine the effects of intertemperol and interprovincial variation in the provincial drug subsidies for seniors and social assistance recipients on overall drug use, the use of drugs specific to the management of chronic health problems amongst individuals with such problems, and individual health status. We also examine the role of income on the probability of chronic health problems, and conditional on this, the use of particular medications.

Project title: Evaluation of Data Sources to Support Pharmacosurveillance.
P. Investigator: Holbrook A
Co-investigators: Keshavjee K, Sebaldt R, **Grootendorst P**, Levine M, Goldsmith C, Willison D, Brogan T, Peterson R, Tennant L
Role on project: Review of statistical methods, implementation of these methods
Funding agency: Health Policy Research Program (HPRP), Research Management and Dissemination Division, Health Canada (project no. 6795-15-2001/4410013)
Funding period: 2002-07/2003-12
Total funding: $103,800
Brief description: 1) We review statistical methods available to estimate drug effectiveness using observational data prone to selection (assignment) bias; 2) Consider the suitability of administrative claims, patient registries & electronic medical records for this purpose; 3) Compare recent post-marketing RCT evidence on efficacy of HRT as primary prevention among post-menopausal women with longitudinal observational data using a variety of adjustments to control for selection bias.

Project title: Federal-provincial health care policy and prescription drug spending: 1975-1998
P. Investigator: **Grootendorst P**
Co-investigators: DiMatteo L
Funding agency: Father Sean O'Sullivan Research Centre Seed Grant Award
Funding period: 2002-1/12
Total funding: $9,000
Brief description: Using data on prescription drug expenditures, by province and source of finance (private, public) over the period 1975-2000, we assess how the design of the provincial drug benefit programs (i.e. generosity and groups covered), changes to federal patent laws, economic growth, and demographic factors have affected public and private spending on prescription drugs.

Project title:	Effects of a prior authorization policy to restrict access to COX-2 inhibitors in a public insurance program
P. Investigator:	Willison D
Co-investigators:	Fortin P, **Grootendorst P**, Lelorier J, Maclure M, Marshall D, Morgan S.
Role on project:	Statistical design, implementation and estimation
Funding agency:	CIHR (application 89240)
Funding period:	2001-10/2003-09
Total funding:	$104,759
Brief description:	We test whether restrictions on the prescribing of a new class of arthritis medications, the COX-2 inhibitors, has reduced analgesic drug costs without adversely affecting patient health and increasing health costs elsewhere. We use longitudinal patient level administrative data on the use of drugs, physician and hospital's services from 3 provincial drug plans that differ in the degree of reimbursement restrictiveness for these drugs: BC (most restrictive), Ontario, and Quebec (least restrictive).

Project title:	Public and private financing: analytics, dynamics and decision-making
P. Investigator:	Hurley JH
Co-investigators:	Abelson J, Butler J, Cobb-Clark D, Crossley TF, Evans RG, Giacomini M, **Grootendorst P**, Stoddart G, Tamblyn R
Role on project:	Statistical modeling of prescription drug use for project substudy: *Micro-econometric analysis of drug cost-sharing in Quebec* with (Hurley and Tamblyn)
Funding agency:	NHRDP 6606-06-2000/2590194
Funding period:	2000-07/2003-03
Total funding:	$367,849
Brief description:	Starting in August 1996, the Quebec provincial government drug plan (RAMQ) introduced public drug coverage to the general population but also introduced large co-payments and deductibles for seniors and social assistance recipients – groups which had previously enjoyed relatively comprehensive coverage. We analyze the effects of these user fees on prescription drug use, program costs, and health indicators using econometric methods which accommodate non-linear budget constraints, heterogeneity in patient-level drug use, and the longitudinal aspect of the data.

Project title:	The impact of reference-based pricing of nitrates on the use of prescription drugs, hospital and physicians' services in British Columbia
P. Investigator:	**Grootendorst P**
Co-investigators:	Dolovich L, Holbrook AM, O'Brien BJ
Funding agency:	Canadian Health Services Research Foundation [grant 97-050], BC Ministry of Health, and Brogan Inc.
Funding period:	1998-11/2001-10
Total funding:	$322,498 (CHSRF: $107,498; BC MOH: $140,000, Brogan Inc.: $75,000)
Brief description:	The Reference Pricing program introduced by the British Columbia Ministry of Health Pharmacare program limits reimbursement of drugs in a cluster of therapeutically similar drugs to the lowest price drug in the cluster. We assess whether the reference pricing of nitrates has lowered overall health care costs without adversely affecting the health of program beneficiaries.

Project title:	The impact of reference-based pricing of calcium channel blockers and ACE inhibitors on the use of prescription drugs, hospital and physicians' services in British Columbia
P. Investigator:	**Grootendorst P**
Co-investigators:	Dolovich L, Holbrook AM, Levy A, O'Brien BJ
Funding agency:	Health Transitions Fund [grant NA222], Drug Information Association
Funding period:	1998-11/2001-10
Total funding:	$188,500 (HTF: $151,000; DIA: $37,500)
Brief description:	The Reference Pricing program introduced by the British Columbia Ministry of Health Pharmacare program limits reimbursement of drugs in a cluster of therapeutically similar drugs to the lowest price drug in the cluster. We assess whether the reference pricing of calcium channel blockers and ACE inhibitors has lowered overall health care costs without adversely affecting the health of program beneficiaries.

Project title:	Global physician expenditure caps and physician services utilization: a three province study
P. Investigator:	Hurley JH
Co-investigators:	**Grootendorst P**, Crossley TF
Role on project:	Statistical modeling of health services use
Funding agency:	Medical Research Council of Canada [grant 14117], Ontario Ministry of Health
Funding period:	1997-04/2001-10
Total funding:	$232,000 (MRC: $165,000; Ontario Ministry of Health: $67,000)
Brief description:	We assess the impact of a series of global physician expenditure caps applied by the Ministries of Health in Ontario, Alberta and Nova Scotia, on physician service patterns (mix and volume of services provided per patients, number of patients seen) and labour supply (hours worked, labour force participation).

Project title:	The effects of changes of co-payment & premium policies on use of prescription drugs in Nova Scotia Seniors' Pharmacare Program
P. Investigator:	Kephart G
Co-investigators:	Reudy J, **Grootendorst P**, Somers E, Hoar J
Role on project:	Statistical modeling of prescription drug use
Funding agency:	Canadian Health Services Research Foundation [grant 97-047], matching support from the NS Health Services Research Fund and Nova Scotia's Senior's Pharmacare Program, Nova Scotia Department of Health
Funding period:	1998-11/2001-10
Total funding:	$124,501 (CHSRF: $41,496; Nova Scotia Government: $83,005)
Brief description:	We assess the impact of a series of user fees applied to prescription drugs taken by beneficiaries of the Nova Scotia Department of Health Senior's Pharmacare Program between 1990-1996 on the overall volume of drugs reimbursed, program costs, and the differential effects of the user fees on drugs used by individuals with specific diseases, and with various levels of income.

Project title:	Outcomes associated with formulary cost-containment strategies
P. Investigator:	Willison D, MacLeod S
Co-investigators:	Levine M, O'Brien B, **Grootendorst P**
Role on project:	Literature review.
Funding agency:	Merck-Frosst Canada
Funding period:	2000-01/12
Total funding:	$25,000
Brief description:	We review the current literature in Canada and the United States evaluating the impact of formulary restrictions for pharmaceuticals on health care utilization and health outcomes, identifying the strengths and limitations of the methods used.

Project title:	Do Drug Plans Matter? Effects of Drug Plan Eligibility on Drug Utilization Among the Elderly, Social Assistance Recipients and the General Population
P. Investigator:	**Grootendorst P**
Co-investigators:	Levine MAH
Funding agency:	Health Transitions Fund [project NA227]
Funding period:	1999-03/2000-10
Total funding:	$122,372
Brief description:	We assess the impact of inter-provincial variations in the generosity of public drug programs for seniors, social assistance recipients and the general population on prescription drug use, use of over the counter drugs, and physician services using longitudinal data from the Statistics Canada National Population Health Surveys.

Project title:	The impact of reference-based pricing on the use of prescription drugs, hospital and physicians' services in British Columbia (Pilot Study)
P. Investigator:	**Grootendorst P**
Co-investigators:	O'Brien BJ, Holbrook AM
Funding agency:	Father Sean O'Sullivan Research Centre Seed Grant Award
Funding period:	1997-09/1998-08
Total funding:	$10,000

Project title:	Do Provincial Drug Plans Matter? Effects of Provincial Drug Plan Eligibility on Drug Utilization Among the Elderly
P. Investigator:	**Grootendorst P**
Co-investigators:	Anderson GA, Feeny DH
Funding agency:	National Health Research and Development Program [grant 6606-6404-NPHS]
Funding period:	1997-02/1998-10
Total funding:	$35,611

Project title:	Health Utilities Index Mark 3: Is it valid for the measurement of health status and health-state utilities?
P. Investigator:	**Grootendorst P**
Co-investigators:	Feeny DH, Furlong W
Funding agency:	Janssen Pharmaceutica Research Foundation
Funding period:	1996-04/1998-03
Total funding:	$12,000

Project title:	Efficacy, effectiveness and cost analysis of nitrate therapy for the prevention of angina pectoris
P. Investigator:	Holbrook AM
Co-investigators:	Dolovich L, **Grootendorst P**, Brogan T, Kitching A, Crossley TF
Funding agency:	Canadian Coordinating Office of Health Technology Assessment [grant 6606-5678-55]
Funding period:	1995-01/12
Total funding:	$31,840

6 Scholarly and professional work

6.1 Work published or in-press (peer-reviewed)

Grootendorst P, Piérard E. Do downturns cause desperation? The effect of economic conditions on suicide rates in Canada. *Applied Economics*, forthcoming.

de Oliveira C, Nguyen VH, Wijeysundera H, Wong W, Woo G, **Grootendorst P**, Liu P, Krahn M. Does research pay? Estimating the payoffs from cardiovascular disease research in Canada. *CMAJ Open*, forthcoming.

Boutis K, **Grootendorst P**, Willan A, Plint AC, Babyn P, Brison RJ, Sayal A, Parker M, Mamen N, Schuh S, Grimshaw J, Johnson D, Narayanan U. Effect of the Low Risk Ankle Rule on the frequency of radiography in children with ankle injuries. *CMAJ*. 2013 Aug 19.

Chit A, Parker J, Halperin SA, Papadimitropoulos M, Krahn M, **Grootendorst P**. Toward more specific and transparent research and development costs: The case of seasonal influenza vaccines. *Vaccine*. 2013 Jul 3.

Nguyen VH, de Oliveira C, Wijeysundera H, Wong W, Woo G, **Grootendorst P**, Liu P, Krahn M. Canada's Contribution to Global Research in Cardiovascular Disease. *Canadian Journal of Cardiology* 2013; 29(6):742-6.

Grootendorst P, Bouchard R, Hollis A. Canada's laws on pharmaceutical intellectual property: the case for fundamental reform. *Canadian Medical Association Journal* 2012;184(5):543-9.

Faulkner GE, **Grootendorst P**, Nguyen V, Andreyeva T, Arbour-Nicitopoulos K, Auld C, Cash S, Cawley J, Donnelly P, Drewnowski A, Dube L, Ferrence R, Janssen I, LaFrance J, Lakdawalla D, Mendelsen R, Powell L, Traill B, Windmeijer F. Economic instruments for Obesity Prevention: Results of a Scoping Review and Modified Delphi Survey. *International Journal of Behavioral Nutrition and Physical Activity* 2011; 8(109): doi:10.1186/1479-5868-8-109.

Leombruno JP, Nguyen GC, **Grootendorst P,** Juurlink D, Einarson T. Hospitalization and surgical rates in patients with Crohn's disease treated with infliximab: a matched analysis. *Pharmacoepidemiology and Drug Safety* 2011; 20(8):838–848.

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Grootendorst P, Hollis A. The Canada-European Union Comprehensive Economic & Trade Agreement: an economic impact assessment of proposed pharmaceutical intellectual property provisions. *Journal of Generic Medicines* 2011; 8(2):81-103.

Morgan S, **Grootendorst P**, Lexchin J, Cunningham C, Greyson D. The cost of drug development: A systematic review. *Health Policy* 2011; 100(1):4-17.

Grootendorst P, Hollis A, Levine DK, Pogge T, Edwards AM. New approaches to rewarding pharmaceutical innovation. *Canadian Medical Association Journal* 2011; 183:681-685.

McLeod L, Shim M, Bereza B, **Grootendorst P**. Financial burden of household out-of-pocket expenditures for prescription drugs: Cross-sectional analysis based on national survey data. *Open Medicine* 2011; 5(1):1-9.

Grootendorst P, Piérard E, Shim MS. The life expectancy gains from pharmaceutical drugs: a critical appraisal of the literature. *Expert Review of Pharmacoeconomics and Outcomes Research* 2009; 9(4):353-364.

Grootendorst P. How should we reward pharmaceutical innovation? *Expert Review of Pharmacoeconomics and Outcomes Research* 2009; 9(4):313-320.

Lichtenberg F, **Grootendorst P**, Van Audenrode M, Latremouille-Viau D, Lefebvre P. The impact of drug vintage on patient survival: a patient-level analysis using Quebec's provincial health plan data. *Value in Health* 2009; 12(6):847-856.

Johnston KM, Gustafson P, Levy AR, **Grootendorst P**. Use of instrumental variables in the analysis of generalized linear models in the presence of unmeasured confounding with applications to epidemiological. *Statistics in Medicine* 2008; 27(9):1539-1556.

Marshall D, Pericak D, **Grootendorst P**, Gooch K, Faris P, Frank C, Bellamy N, Torrance G, Feeny D. Validation of a prediction model to estimate Health Utilities Index Mark 3 utility scores from WOMAC index scores in patients with osteoarthritis of the hip. *Value in Health* 2008; 11(3):470-477.

Kephart G, Skedgel C, Sketris I, **Grootendorst P**, Hoar J. Effects of copayments on the use of prescription drugs in the presence of annual payment limits: can potential risks to patients be reduced? *American Journal of Managed Care* 2007; 13(part 2):328-334.

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Bhatti T, Einarson T, Austin Z, **Grootendorst P**. The impact of financial incentives on pharmacist dispensing habits: Evidence from the British Columbia Product Incentive Plan. *Journal of Pharmaceutical Finance, Economics & Policy* 2007; 16(4):35-56.

Bennett HA, Boon H, Romans S, **Grootendorst P**. Becoming the best mom that I can: Women's experiences of managing depression during pregnancy – a qualitative study. *BMC Women's Health* 2007; 7(13): doi:10.1186/1472-6874-7-13

Grootendorst P. A review of instrumental variables estimation in the applied health sciences. *Health Services and Outcomes Research Methodology* 2007; 7(3-4):159-179.

Grootendorst P, Marshall D, Pericak D, Bellamy N, Feeny D, Torrance G. A model to estimate Health Utilities Index Mark 3 utility scores from WOMAC index scores in patients with osteoarthritis of the knee. *Journal of Rheumatology* 2007; 34:534–42.

Grootendorst P, Di Matteo L. The effect of pharmaceutical patent term length on research and development and drug expenditures in Canada. *HealthCare Policy* 2007; 2(3):63-84.

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Austin P, **Grootendorst P**, Anderson G. A comparison of the ability of different propensity score models to balance measured variables between treated and untreated subjects: A Monte Carlo study. *Statistics in Medicine* 2006; 26(4):734-53.

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Book Chapters

Grootendorst P, Hollis A, Edwards A. Patents and other incentives for pharmaceutical innovation. in Anthony J Culyer, ed. *Encyclopedia of Health Economics*. London: Elsevier, forthcoming 2013.

Auld C, **Grootendorst P**. Instrumental variables: informing policy. in Anthony J Culyer, ed. *Encyclopedia of Health Economics*. London: Elsevier, forthcoming 2013.

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Auld MC, **Grootendorst P**. Challenges for causal inference in obesity research, in John Cawley, ed. *Handbook of the Social Science of Obesity*. New York: Oxford University Press, 2011.

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Peer Reviewed Abstracts

Holbrook A, **Grootendorst P**, Willison D, Goldsmith C, Sebaldt, Keshavjee K. Can current electronic systems meet drug safety and effectiveness requirements? AMIA 2005. Washington, DC. October 22-26, 2005.

Holbrook A, **Grootendorst P**, Willison D, Sebaldt R, Goldsmith C, Keshavjee K, Leung M, Gaebel K. Addressing Canada's National Pharmaceutical Strategy (NPS): electronic systems for pharmacosurveillance. *Canadian J Clin Pharmacol* 2005;12:e42.

Holbrook A, **Grootendorst P**, Willison D, Sebaldt R, Goldsmith C, Levine M, Keshavjee K. Evaluation of data sources to support pharmacosurveillance in Canada. *Health Canada Science Forum*, October 18-19 2004. Ottawa, Ontario.

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Levine M, **Grootendorst P**. Alendronate co-medications may limit its use. *Clinical Pharmacology and Therapeutics* 1998; 63(2):197.

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Holbrook AM, O'Brien B, **Grootendorst P**. Letter to the editor re: Boulet AP, Tessier G. Reference-based pricing in British Columbia: Implications for cardiologists – An analysis. *Canadian Journal of Cardiology* 1997;13:640,689.

Marshall JK, **Grootendorst P**, Holbrook, A. Restricted access for PPIs not a panacea. *Canadian Medical Association Journal* 2002; 167:1102-1104.

6.2 Work completed but not yet published

Cambourieu C, Hollis A, **Grootendorst P**, Pomey M-P. *Fixation des prix des médicaments génériques au Québec.* Report prepared for the Commissaire à la santé et au bien-être, Gouvernement du Québec, July 2013. www.csbe.gouv.qc.ca.

Hollis A, Grootendorst P. Tendering generic drugs: what are the risks? Report commissioned by *Canadian Generic Pharmaceuticals Association,* October 2012. http://www.canadiangenerics.ca/en/news/docs/10.24.12%20Tendering%20Generic%20Drugs%20-%20What%20Are%20the%20Risks_FINAL.pdf

Grootendorst P, Nguyen H. Health Technologies as a Cost-Driver in Canada. Final Report to the Strategic Policy Branch, Office of Pharmaceuticals Management Strategies, Health Canada, June 2011. http://individual.utoronto.ca/grootendorst/pdf/grootendorst-et-al-final-report.pdf

Grootendorst P, Hollis A. Managing Pharmaceutical Expenditure: Overview and options for Canada. Report commissioned by *Canadian Health Services Research Foundation,* Healthcare Financing, Innovation and Transformation Policy Series, February 2011. http://www.chsrf.ca/Libraries/Commissioned_Research_Reports/11-CHSRF-Paul_Grootendorst_paper_EN_FINAL.sflb.ashx

Grootendorst P, Rocchi M, Segal H. An economic analysis of the impact of reductions in generic drug rebates on community pharmacy in Canada. November 21, 2008 http://individual.utoronto.ca/grootendorst/pdf/Grootendorst_et_al_Pharmacy_Rebates_Report_Final.pdf

Quiñonez C, Locker D, Sherret L, **Grootendorst P**, Azarpazhooh A, Figueiredo R. An environmental scan of publicly financed dental care in Canada. Community Dental Health Services Research Unit, Dental Research Institute, Faculty of Dentistry, University of Toronto, 2006. http://www.fptdwg.ca/assets/PDF/Environmental_Scan.pdf.

Holbrook A, Keshavjee K, Sebaldt R, **Grootendorst P**, Levine M, Goldsmith C, Willison D, Brogan T, Peterson R, Tennant L. Evaluation of data sources to support pharmacosurveillance. Final report submitted to the *Health Policy Research Program, Health Canada* pursuant to grant HPRP #6795-15-2001/4410013, 2004.

Grootendorst P, Mackeigan L, Metge C, Taylor J. An economic study on the expected impact of the Transparent Drug System for Patients Act (2006). Mimeo.

Grootendorst P, Levine M. Do Drug Plans Matter? Effects of Drug Plan Eligibility on Drug Use Among the Elderly, Social Assistance Recipients and the General Population. Final report to the Health Transitions Fund pursuant to grant NA227, 2000 and SEDAP research paper no. 73, 2002. (Available on-line at http://socserv.socsci.mcmaster.ca/sedap/p/sedap73.pdf)

Grootendorst P, Dolovich L, Holbrook A, Levy A, O'Brien B. The Impact of Reference Pricing of Cardiovascular Drugs on Health Care Costs and Health Outcomes: Evidence from British Columbia – Volume I: Summary. SEDAP research paper no. 70, 2002. (Available on-line at http://socserv.socsci.mcmaster.ca/sedap/p/sedap70.pdf)

Grootendorst P, Dolovich L, Holbrook A, Levy A, O'Brien B. The Impact of Reference Pricing of Cardiovascular Drugs on Health Care Costs and Health Outcomes: Evidence from British Columbia – Volume II: Technical Report. SEDAP research paper no. 71, 2002. (Available on-line at http://socserv.socsci.mcmaster.ca/sedap/p/sedap71.pdf)

Willison D, Wiktorowicz M, **Grootendorst P**, O'Brien B, Levine M, Deber R, Hurley J. International experience with pharmaceutical policy: Common challenges and lessons for Canada. Final report to the Health Transitions Fund pursuant to grant NA236, 2001. Also appears as McMaster University Centre for Health Economics and Policy Analysis Working Paper 01-08, 2001. Available online at: http://www.chepa.org/pdfs/01-08.pdf

Willison D, **Grootendorst P**, O'Brien B, Levine M, MacLeod S. Outcomes associated with formulary cost-containment strategies: A literature review and methodological critique. Mimeo. McMaster University, August 2000.

Willison D, **Grootendorst P**, Hurley J. Variation in Pharmacare coverage across Canada. *McMaster University Centre for Health Economics and Policy Analysis Working Paper 98-08*, 1998. Available online at: http://www.chepa.org/pdfs/98-08.pdf

Hurley J, Feeny D, Giacomini M, **Grootendorst P**, Lavis J, Stoddart G, Torrance G. Introduction to the concepts and analytical tools of health sector reform and sustainable financing: a pre-course distance-learning module. Economic Development Institute, World Bank, 1997.

Holbrook AM, Dolovich L, **Grootendorst P**, Brogan T, Kitching A, Crossley TF. Efficacy, effectiveness and cost analysis of nitrate therapy for the prevention of angina pectoris. Final report submitted to the *Canadian Coordinating Office of Health Technology Assessment* pursuant to grant 6606-5678-55, 1996.

6.3 Work submitted for publication

Li Y, Abbaspour MR, **Grootendorst PV**, Rauth AM, Wu XY. Simultaneous Optimization of Polymer-Lipid Hybrid Nanoparticles for the Delivery of Ionic Water-Soluble Drugs. Revised version submitted to *International Journal of Pharmaceutics* 2010-04.

Hollis A, **Grootendorst P**. A comparison of mechanisms for setting generic drug prices. Submitted to *Health Policy* 2013-12.

6.4 Publications in Popular Media

Grootendorst P. Catastrophic drug coverage: A way forward. *Globe and Mail* April 5, 2011.

Grootendorst P. The payer's role – effects of drug plan design on patient compliance. *Canadian Healthcare Manager* 2002; 9(3):29.

6.5 External Presentations

THETA Policy Symposium, Toronto 2012-05. Presented: "Physician fee cuts and physician work effort: some research ideas"

CIRANO-INM-CHSRF Conference on Health Reform, Montreal 2011-11. Presented: "A sliding scale to reimburse generic drugs"

Canadian Pharmaceutical Policy Research Collaboration, Ottawa 2011-11. Presented: "Public drug plans' demand responses to strengthened intellectual property protection: evidence from Ontario"

International Health Economics Association Conference, Toronto, 2011-07. Discussant: Powell: "Soda Taxes and Adolescent Body Weight: Evidence from Panel Data"

Canadian Pharmaceutical Policy Research Collaboration, Halifax 2011-05. Presented: "Fifty years of new drug approvals in Canada"

Canadian Health Services Research Foundation, Healthcare Financing, Innovation and Transformation Policy Series *Ottawa, 2011-02* Presented: "Policy options to support pharmaceutical innovation"; 2011-03 Presented "Innovation and Pharmaceutical Spending" via webinar

Masters of Biotechnology Program, University of Toronto, Mississauga, 2010-10 Presented: "How should we reward pharmaceutical innovation?"

Third Biennial Conference of the American Society of Health Economists, Ithaca 2010-06. Discussant: Hyppolite and Trivedi: "Alternative Approaches for Econometric Analysis of Panel Count Data using Dynamic Latent Class Models"

Canadian Health Economics Study Group, Montreal 2010-06. Discussant: Latimer: "Effects of introducing then removing cost-sharing for drugs among people with schizophrenia in Quebec: A natural experiment"

Canadian Pharmaceutical Policy Research Collaboration, Toronto 2010-05. Discussant: Hollis: "Generic drug pricing policy for Canada"

Toronto Health Economics and Technology Assessment Collaborative, Toronto 2010-02. Presented: "Instrumental variables estimation"

Canadian Pharmaceutical Policy Research Collaboration, Ottawa 2009-11. Presented: "Determinants of generic drug entry in Canada"

Canadian Health Economics Study Group, University of Waterloo, 2009-05. Discussant: Lang "The Impact of Mental Health Insurance Laws on State Suicide Rates"

Hot Topics in Health Policy Lecture Series, University of Toronto, 2008-11 Presented: "How should we reward pharmaceutical innovation?"

Masters of Biotechnology Program, University of Toronto, Mississauga, 2008-10 Presented: "How should we reward pharmaceutical innovation?"

17th European Workshop on Econometrics and Health Economics, Coimbra, 2008-09 Presented: "Distributional effects of needs based drug subsidies in Canada"

Canadian Economics Association Meetings, Vancouver, 2008-06. Presented: "Effects of 'Authorized Generics' on Canadian Drug Prices"

Canadian Economics Association Meetings, Vancouver, 2008-06. Discussant: "Effects of insurance coverage on drug access"

Canadian Health Economics Study Group, Fredericton, 2008-05. Discussant: Emery "Public Pensions and the Mortality of Seniors in Canada: Comparing Means-Tested and Universal Eligibility, 1921-1970"

Centre for Health Economics and Policy Analysis, McMaster University, Hamilton, 2008-04. Presented: "Alternatives to the patent system to spur innovation"

Centre for Evaluation of Medicines, Hamilton, 2008-01. Presented: "Prescription drug effectiveness: a re-examination of the aggregate data"

International Society for Pharmacoeconomics and Outcomes Research Meetings, Bogota, 2007-12. Presented: "The effects of drug price controls: evidence from Canada"

Department of Economics, University of Waterloo, 2007-10. Presented: "Prescription drug effectiveness: a re-examination of the aggregate data"

International Health Economics Association Conference, Copenhagen, 2007-07. Presented: "Prescription drug effectiveness: a re-examination of the aggregate data"

Canadian Economics Association Meetings, Halifax, 2007-06. Presented: "Distributional effects of needs based drug subsidies in Canada"

Competition Bureau Intellectual Property Symposium, Ottawa, 2007-03. Presented: "Effects of 'Authorized Generics' on Canadian Drug Prices"

Canadian Association for Health Services and Policy Research Meetings, Vancouver, 2006-09. Presented: "Prescription drug effectiveness: a re-examination of the aggregate data"

Canadian Economics Association Meetings, Montreal, 2006-06. Presented: "Effects of Reference Pricing of Cardiovascular Drugs on Health Outcomes"

Canadian Health Policy Implementation Initiative Meetings, King City, 2006-04. Presented: "The Current Canadian Pharmaceutical Policy Regime"

Toward a National Pharmaceuticals Strategy conference, Vancouver, 2006-02. Presented: "National catastrophic drug insurance revisited: Who would benefit from Senator Kirby's recommendations?"

Facilitators and Barriers of Conducting Methodologically Rigorous Research in Drug Policy and Medication Management in the Real World [international video conference], 2005-09
Presented: "Effects of reference pricing of cardiovascular drugs on health care costs and health outcomes"

International Health Economics Association Conference, Barcelona, 2005-07. Presented: "Cigarette taxation and obesity"

Canadian Economics Association Conference, Toronto, 2004-06 Presented: "Distributional effects of 'general population' prescription drug programs in Canada

Canadian Health Economics Study Group, Montreal, 2004-05 &
Canadian Association for Health Services and Policy Research Inaugural conference, Montreal, 2004-05
Presented: "Patent Protection, Research and Development and Pharmaceutical Drug Expenditures: Evidence from Canada"

Symposium on Cross Border Internet Pharmacy: Public Policy Implications, Toronto, 2004-03
Presented: "Cross border trade in pharmaceuticals and Canadian pharmaceutical R&D"

12th European Workshop on Econometrics and Health Economics, Menorca, 2003-09
Discussant: Nolan "A cross sectional analysis of the utilization of GP services in Ireland: 1987-2001"

Canadian Health Economics Study Group, Banff, 2003-07
Discussant: Ferguson, Laporte "Investment in health when health is stochastic"

Social and Economic Dimensions of an Aging Population Conference, Hamilton, 2003-04
Presented: "A SEDAP perspective on immigration"

Canadian Association of Population Therapeutics Annual Conference, Quebec City, 2003-03
Presented: "Estimating treatment effectiveness using observational data: The case of HRT and coronary heart disease"

Ontario Office of Economic Policy Winter 2003 Retreat on Health Economics, Toronto, 2003-01
Presented: "Patent Protection, Research and Development and Pharmaceutical Drug Expenditures: Evidence from Canada"

Institute for Clinical Evaluative Sciences in Ontario, Toronto, 2002-11
Presented: "Estimating Treatment Effectiveness using Observational Data: The Case of HRT and Coronary Heart Disease"

Limited Use Committee, Ontario Drug Benefit Program, Toronto, 2002-10
Presented: "Trends in Antibiotics Use, Expenditures and Resistance in Ontario before and after Quinolone Limited Use"

Conference on Economics of Health Care Reform (Sponsored by the Department of Economics, University of Manitoba), Winnipeg, 2002-10
Presented: "Patent Protection, Research and Development, and Pharmaceutical Drug Expenditures: Evidence from Canada"

Pharmaceutical Issues Committee, Federal Provincial Territorial Advisory Committee on Health Services, Ottawa, 2002-04
Presented: "The impact of reference pricing of cardiovascular drugs on health care costs and health outcomes"

Canadian Association of Population Therapeutics Annual Conference, Toronto, 2002-04
Presented: "The impact of reference pricing of cardiovascular drugs on health care costs and health outcomes"

Healthy Outcomes Conference, Lake Louise, 2002-04

Presented: "Ways to Reduce Drug Program Expenditures Without Compromising Quality"
Father Sean O'Sullivan Research Centre Symposium: Interprovincial and international comparisons of drug reimbursement policy, Toronto, 2001-11
Presented: "A review of Canadian provincial drug subsidy programs"
10th European Workshop on Econometrics and Health Economics, London, 2001-09
Discussant: Batalgi, Griffin "Rational addiction to alcohol: Panel data analysis of liquor consumption"
International Health Economics Association Conference, York UK, 2001-07
Presented: "Effects of reference pricing of nitrates, ACE inhibitors and calcium channel blockers on health and health care costs"
Canadian Health Economics Research Association Conference, Toronto, 2001-05
Presented: "The effects of reference pricing of nitrates on choice of anti-anginal drug therapy: initial results from patient-level claims data"
Health Transitions Fund Research Dissemination Workshop, Toronto, 2001-04
Presented: "Do drug plans matter? Effects of drug plan generosity on drug use among the elderly, social assistance recipients and the general population"
Regional Health Economics Seminar Series, Ontario Ministry of Health, Toronto, 2001-03
Presented: "The effects of reference pricing of nitrates on choice of anti-anginal drug therapy: initial results from patient-level claims data"
Department of Economics, Lakehead University, Thunder Bay, 2001-03
Presented: "Do drug plans matter? Effects of drug plan generosity on drug use among the elderly, social assistance recipients and the general population"
Institute for Clinical Evaluative Sciences in Ontario, Toronto, 2000-09
Presented: "Evaluation of nitrate drug discontinuation under the Reference Pricing Policy in British Columbia"
9th European Workshop on Econometrics and Health Economics, Amsterdam, 2000-09
Discussant: Schellhorn "Effect of Variable Health Insurance Deductibles on Demand for Physician Visits"
Canadian Health Economics Research Association Conference, Edmonton, 1999-08
Presented: "Dispensing with incentives: An evaluation of generic drug substitution policies in British Columbia"
Canadian Health Economics Research Association Conference, Edmonton, 1999-08
Discussant: "Access to Prescription Drugs for Beneficiaries of Provincial Drug Plans in Canada"
International Health Economics Association Conference, Rotterdam, 1999-06
Presented: "Global physician expenditure caps and individual-collective incentive conflict: physician responses in Canada"
Canadian Economics Association Meetings, Toronto, 1999-05
Presented: "Evaluation of the Reference Pricing Policy in British Columbia"
Harvard School of Public Health, Harvard University, Boston, 1999-04
Presented: "Evaluation of the Reference Pricing Policy in British Columbia"
Department of Economics, University of Alberta, Edmonton, 1999-01
Presented: "Evaluation of the Reference Pricing Policy in British Columbia"
Institute of Health Economics, Edmonton, 1999-01
Presented: "Effects of Provincial Drug Plan Eligibility on Prescription Drug Use Among Seniors using the 1994-95 National Population Health Survey"
Department of Economics, York University, North York ON, 1998-10
Presented: "Evaluation of the Reference Pricing Policy in British Columbia"
7th European Workshop on Econometrics and Health Economics, Helsinki, 1998-09
Discussant: Parkin, Rice, Sutton "Semi-parametric estimation of morbidity effects on general practitioner utilisation in the presence of time and age heterogeneity." [read by A Jones]

6th European Workshop on Econometrics and Health Economics, Lisbon, 1997-09
Discussant: Santos-Silva and Windmeijer "Stopped-sum models for health care demand."
Department of Economics, Research School of Social Sciences, Australia National University, Canberra, 1997-05
Presented: "Health policy evaluation using longitudinal insurance claims data: an application of the panel tobit estimator"
5th European Workshop on Econometrics and Health Economics, Barcelona, 1996-09
Presented: "Health policy evaluation using longitudinal insurance claims data: an application of the panel tobit estimator"
International Health Economics Association Conference, Vancouver, 1996-05
Presented: "On becoming 65 in Ontario: Effects of drug plan eligibility on use of prescription medicines"
4th European Workshop on Econometrics and Health Economics, Paris, 1995-09
Discussant: Lopez and Saez "Panel data methods for medical care demand estimation"
Canadian Economics Association Meetings, Montreal, 1995-06
Presented: "Health policy evaluation using longitudinal insurance claims data: an application of the panel tobit estimator"
School of Policy Studies, Queens University, Kingston, 1995-03
Presented: "A comparison of alternative models of prescription drug utilization"
Department of Economics, Sir Wilred Laurier University, Kitchener, 1995-02
Presented: "A comparison of alternative models of prescription drug utilization"
3rd European Workshop on Econometrics and Health Economics, Antwerp, 1994-10
Presented: "On becoming 65 in Ontario: Effects of drug plan eligibility on use of prescription medicines"

7 Teaching

7.1 Graduate

- PHM 1132H - (course coordinator) *Applied Health Econometrics*, Dept of Pharmaceutical Sciences, University of Toronto, 2012-01/4 (taught 11/12 sessions), 2013-01/04 (taught 7/12 sessions)
- PHM 1128H - *Introduction to Models and Methods of Research in Clinical, Social and Administrative Pharmacy*, Dept of Pharmaceutical Sciences, University of Toronto, 2010-09/12 (taught 1/11 sessions), 2011-09/12 (1), 2013-09/12 (1).
- PPG 2010H* - (course coordinator) *Panel Data Methods for Public Policy Analysis*, University of Toronto, 2009-01/04 (12/12)
- PHM 1126H* - (course coordinator) *The Economics of Health and Health Care*, Dept of Pharmaceutical Sciences, University of Toronto, 2005-01/04 (taught 12/12 sessions), 2006-01/04 (2), 2007-01/04 (12), 2008-01/04 (12)
- ECON 793 – *Health Economic Policy*, Dept of Economics, McMaster University, 2007-01/04 (3/12 sessions), 2008-01/04 (3/12), 2009-01 (2/12), 2010-01 (2), 2011-01 (2), 2012-01 (2)
- CHS-HRM 789* – (course coordinator) *Health Economics for Health Care Managers*, Faculty of Health Sciences, McMaster University, 2002-01/04 (7/12 sessions), 2001-01/04 (8), 2000-04/07 (7), 2000-01/04 (7), 1999-01/04 (8), 1998-01/04 (9), 1997-01/04 (9).
- ECON-HRM 788 – *Health Economics I*, Dept of Economics, McMaster University, 1996-09/12 (1/12 sessions), 1997-09/12 (3), 1998-09/12 (2).

- ECON-HRM 791 – *Health economics II*, Dept of Economics, McMaster University, 1999-01/04 (1/12 sessions), 2000-01/04 (4), 2001-01/04 (3), 2002-01/04 (3).

7.2 Undergraduate

- PHM 110 – *Health Systems I*, University of Toronto 2011-09/12 (2 sessions), 2013-09/12 (1 session).
- PHM 213* – *Health Economics and Pharmacoeconomics*, University of Toronto 2013-01/04 (9/12 sessions),
- PHM 227 – *Health Systems in Society I*, University of Toronto 2003-09/12 (1 session), 2004-09/12 (1), 2005-09/12 (1), 2006-09/12 (1), 2008-09/12 (1), 2009-09/12 (1), 2010-09/12 (1)
- PHM 425* – *Pharmacy Practice Research*, University of Toronto (course coordinator) 2002-09/12 (1/13 sessions), 2003-09/12 (8), 2004-09/12 (10), 2005-09/12 (10), 2006-09/12 (10), 2007-09/12 (10), 2008-09/12 (9), 2010-09/12 (10), 2011-09/12 (9), 2013-09/12 (10).
- PHM 427 – *Health Systems in Society II*, University of Toronto 2006-09/12 (1 session)
- ECON 3Z3* – *Health Economics*, McMaster University 1992-01/04, 1995-09/12.

* I had major responsibility for the design of this course.

7.3 Other Instructional activities

- Radiation Oncology & Medical Oncology Residency Training Program, McMaster University (2003) (health economics training).
- Advisor on development of a course in pharmacy practice research, Faculty of Pharmacy and Biochemistry, San Marcos University, Lima, Peru (2004)
- International Health Training program, Centre for International Health, Faculty of Medicine, University of Toronto (2005, 2006)

7.4 Student Supervision

University of Toronto

Supervisor, Post-doctoral fellowship

Van Hai Nguyen, 2009-10/2013-07: economics of dental coverage, obesity [completed]
Logan MacLeod, 2009-09/2010-08: economics of catastrophic drug insurance [completed]
Yuqian Lu, 2005-09/2007-08: economics of obesity [completed]
Minsup Shim, 2006-03/2009-02: reference pricing of pharmaceuticals [completed]

Supervisor, Pharmaceutical Sciences PhD

Kavisha Jayasundara, 2011-09: economics of drugs for rare diseases
Ivana Todorovic, 2008-09: impacts of changes in public drug plan procurement of generic drugs
Ayman Chit, 2008-09/2013-08: economic aspects of vaccine development and procurement [completed]
Doreen Au, 2004-09/2009-09: price and income sensitivity of tobacco use [completed]
Heather Bennett, 2003-11/2007-02: health outcomes of depression during pregnancy [completed]

Co-Supervisor, Pharmaceutical Sciences PhD

Bassem Hamandi, 2010-09: economic evaluation of lung transplantation [with M Papadimitropoulos]
Basil Bereza, 2011-09: economic evaluation of genetic screening [with M Papadimitropoulos]
Supervisor, Pharmaceutical Sciences MSc
Ethar Ismail, 2011-09/2013-12: economics of generic drug procurement [completed]
Ivana Todorovic, 2006-09/2008-08: distributional effects of a national catastrophic drug insurance plan [completed]
Antonio Grossi, 2003-09/2007-01: effects of reference pricing on drug costs [completed]
Taimur Bhatti, 2004-01/2005-11: pharmacists' responses to economic incentives to dispense generic drugs [completed]
Andrew Tam, 2004-09: spillover effects of reimbursement restrictions in large public drug plans on costs to private sector plans [withdrew from program]
Faculty Supervisor, Industrial Pharmacy Residency Program
Farah Hemraj, 2003/2004; Cory Cowan, 2004/2005; Mayce Al-Sukhni 2007/2008; Lucas Krajewski 2008/2009
Faculty Supervisor, PharmD Program
So-Hee Kang 2011; Reem Haj, 2008; Cory Cowan, 2008
Member, Pharmaceutical Sciences PhD Thesis Committee
Ba Pham, 2008-01: calibration of models for economic appraisal
John Leombruno, 2005-05: estimation of drug treatment effects using observational data [completed]
Jennifer Pereira, 2004-04/2008-08: composite measures of medicine risk and benefit [completed]
Yongqiang Li, 2005-05/2008-03: prediction of drug delivery using nonlinear models [completed]
Member, Pharmaceutical Sciences MSc Thesis Committee
Nihar Gondalia, 2013-09: open source drug development.
Tina Papastavros, 2009-04: economic evaluation of treatments for opioid dependence
Colin Vincente, 2002-10/2005-04: economic evaluation of glaucoma screening [completed]
Yongqiang Li, 2004-05/2005-04: prediction of drug delivery using nonlinear models [completed]
PhD Thesis Committee Membership at the University of Toronto
Carlos Quinonez, 2006-01/2009-02: political economy of dentistry in Canada (Faculty of Dentistry, Section of Community Dentistry) [completed]
Stephanie Choi, 2013-01/: burden of mental health morbidity amongst those infected with HIV (Faculty of Medicine, Institute of Medical Science)
Member, MSc Thesis Committee (Faculty of Medicine, Dept HPME)
Meghan McMahon, 2005-08/2007-05: estimation of the effect of obesity on health services use in Canada [completed]

McMaster University
Member, Department of Economics PhD Thesis Committee
Emmanuel Pierard, 2002-05/2005-12: macro-economic determinants of suicide rates; empirical health production functions [completed]
Co-supervisor, MSc Thesis in Economics
Jesper Bagger, York University, UK, 2002-07/09: review of methods to estimate treatment effects using observational data [completed]

Alistair Dickson, York University, UK, 1998-07/09: resolving divergence between willingness to pay and willingness to accept and implications for economic evaluation [completed]
Pekka Paunio, York University, UK, 1996-07/09: a survey of welfare measures in economic evaluation [completed]
Paul Contoyannis, York University, UK, 1995-07/09: price sensitivity of tobacco use [completed]

8 Service

University of Toronto

Committee Membership
- BScPhm Program Standing Committee (2012-12/)
- Curriculum and Assessment Subcommittee (2013-09/)
- Academic Leadership Committee (2012-12/)
- Research Advisory Committee (2011/)
- Graduate and Postgraduate Committee, Faculty of Dentistry (2007-09/2009-6)
- Cross-Appointment Committee (2008-09/)
- Graduate Admissions (2007-09/2008-08)
- Undergraduate Pharmacy Awards Committee (2006-09/)
- Pharmacy Library and Information Services Committee (2007-03/)
- Chair, Undergraduate Pharmacy Ethics Committee (2006-02/)
- Pharmacy Animal Care Committee (2003-12/2006-05)
- Pharmacy Undergraduate Admissions Committee (2003/)
- Graduate Research in Progress Committee (Assistant Chair: 2003-09/2004-08, Chair: 2004-09/2007-05)

Ad Hoc Committee Membership
- Internal Reading Committee for Tenure review (2009-11)
- TA funding allocation and student travel funding (2008-11)
- Advisory Committee for the Appointment of a Dean, Faculty of Pharmacy (2008-06)
- PTR Committee (2007-05)
- Review committee, U of T employee experience survey (2006-07), U of T *Bulletin* (2007-08)
- Overhead Committee (2003-10)
- PharmD appeals committee (2003-06)
- Graduate Department of Pharmaceutical Sciences SSHRC Ranking Committee (2003-10-24)
- Social and Administrative Pharmacy Hiring Committees (2003-04/)

Other
- Faculty Liaison, Industrial Pharmacy Residency Program (ESI Canada, 2003-08/)
- Faculty Liaison, St Joseph's Hospital Pharmacy Residency Program (2007-12/)
- Board of Directors, Faculty Club (2005-09/2008-08)

Student Examination
- Chair, Various Thesis Examination Committees
- Internal examiner, PhD Thesis (Greg Payne, HPME, 2010-05)
- Internal examiner, PhD Qualifying Exam (Yeesha Poon, Pharm Sci, 2013-10)
- Internal examiner, PhD Qualifying Exam (Andrea Burden, Pharm Sci, 2011-01)
- Examiner, MSc Thesis (Monica Yu, IHPME, 2013-09w)
- Internal examiner, MSc Thesis (Nina Lathia, Pharm. Sci., 2008-03)
- Internal examiner, MSc Thesis (Hamid Sadri, Pharm. Sci., 2004-08)

McMaster University

Committee Membership

Clinical Health Sciences (Health Research Methodology) MSc Admissions Committee (2000-01/2002-09)
CHS (HRM) Graduate Education Committee (2000-08/2002-09)
Chair, Committee on Academic Cross-fertilization in CE&B (2002)
Health Sciences Library Users Committee (2001-10/2002-09)
Chair, Department of Clinical Epidemiology and Biostatistics Special Events Programming Committee (2002)
FSORC Seed Grant Competition Review Committee (2001-04/2002-09)

Student Examination

CHS (HRM) MSc Comprehensive Examination Committee (2002-03/2002-09)
CHS (HRM) MSc Thesis Committee: Gord Blackhouse (2001) (Internal Reader); Lisa Dolovich (1998), Nicole Brazier (2002) (Internal Observer)
CHS (HRM) PhD Comprehensive Examiner: Sue Whittaker (2002)
Department of Economics PhD Comprehensive Examination Committee (Health Economics) (2000-08/2002-09)

Referee

Academic Journals

American Journal of Managed Care; The B.E. Journal of Economic Analysis & Policy; BMC Health Services Research; Canadian Journal of Clinical Pharmacology; Canadian Journal of Economics; Canadian Journal of Public Health; Canadian Medical Association Journal; Canadian Public Policy; Centre for Health Economics and Policy Analysis Working Paper Series; Eastern Economic Review; Economics and Human Biology; European Journal of Health Economics; Expert Review of Pharmacoeconomics & Outcomes Research; Government and Policy C; Health Affairs; Health and Canadian Society; Health Care Management Science; Health Economics; Health Economics, Policy and Law; Health Policy; Healthcare Policy; Health Reports; Health Services and Outcomes Research Methodology; Health Services Research; International Journal for Equity in Health; International Journal of Public Health; Journal of Applied Economics; Journal of Clinical Epidemiology; Journal of General Internal Medicine; Journal of Health Economics; Journal of Mental Health Policy and Economics; Journal of Population Therapeutics and Clinical Pharmacology; Journal of Rheumatology; Medical Care; Medical Decision Making; Open Medicine; Pharmaceutical Development and Regulation; Pharmacoeconomics; PLoS ONE; Quality of Life Research; Review of Income and Wealth; R&D Management; Scottish Journal of Political Economy; Social Science and Medicine; Value in Health.

Funding Agencies

Qatar National Research Fund (2011); MITACS Doctoral Fellowship (2010); Alberta Heritage Foundation for Medical Research (2009); Canadian Institutes of Health Research (CIHR) Health Research Salary (A) Committee (2009-01/2011); CIHR External Review (2005); CIHR Health Research Training (A) Committee (2000-07/2003-06); CIHR Post Market Drug Safety and Effectiveness (DSA) – Winter 2010 Competition; UK Medical Research Council (2008); Michael Smith Foundation for Health Research (2005-03, 2006-04); Heart and Stroke Foundation of Canada (2002); Australian Research Council (2002); Canadian Health Services Research Foundation (2002-03, 2004-12, 2005-04); CIHR/SSHRCC/NHRDP Health Career Awards Program (2000-04,11); Social Sciences and Humanities Research Council of Canada (1999-1); Canadian Coordinating Office for Health Technology Assessment (1997-4); Canadian Health Services Research Foundation (2000-

2); Medical Research Council of Canada (1998-5, 1997-10); National Health Research and Development Program (1998-1, 1997-11)

Academic Prizes
Kenneth J. Arrow Award Committee of the International Health Economics Association (2009/present)

Tenure Review
University of Aberdeen (2010), McMaster University (2009, 2 reviews), University of British Columbia (2009), University of Manitoba (2006)

Graduate Thesis
External examiner, PhD Thesis: Theresa Longobardi, York University, 2003-05; Van-Hai Nguyen, Concordia University, 2009-08; Zhe Ren, Dalhousie University, 2011-01.
External examiner, MSc Thesis: Sumeet Singh, McMaster University, 2003-09.

Conference Program Committees
Canadian Health Economics Study Group (CHESG) meetings (2005/present); Canada's Research-Based Pharmaceutical Companies (Rx&D) Annual Policy Conference; International Health Economics Association (IHEA) World Congress 2007, 2009; Annual Health Econometrics Workshop (2009/present); Conference of the Canadian Association for Health Services and Policy Research (2004, 2006, 2007); Canadian Health Economics Research Association Conference (2000/2002).

Conference Organization
2011 International Health Economics Association World Congress; Merck Frosst Distinguished Speaker Series in Health Economics (2000/2003); CHESG meetings (2005)

Editorial Boards
Editorial Board, *Canadian Public Policy* (2000/2012)
Editorial Board, *Health Economics* (2005/2006)
Associate Editor, *Health Economics* (2007/present)

Data & Safety Monitoring Boards
Norman WV, (PI) "Better Contraceptive Choices: Immediate vs Interval insertion of Intrauterine Contraception after Second trimester Abortion" (2010/2012)

Advisory Boards
Allergan Canada (2008/2010); Bayer Canada (2009/present); Merck Frosst Canada (2007/2010); Expert Working Group on Drug Expenditures, Canadian Institute for Health Information (2003/2004, 2007/2008, 2011/); SSHRC and Statistics Canada Research Data Centre Access Committee (2001-01/present); Patented Medicine Prices Review Board (PMPRB) Working Group on Costs of Making and Marketing (2008-05); Rx&D Policy Advisory Board (2008/2011)

9 Expert Testimony

I have provided expert testimony and/or reports in legal proceedings on behalf of both brand and generic drug manufacturers.

10 Media Interviews

I have provided commentary in print (CBC Online, Globe and Mail, Canadian Press), TV (CBC News, Lang and O'Leary Exchange, Business News Network, Radio Canada) and radio interviews.

Court File No. T-2030-13

FEDERAL COURT

BETWEEN:

NEIL ALLARD
TANYA BEEMISH
DAVID HEBERT
SHAWN DAVEY

PLAINTIFFS

and

HER MAJESTY THE QUEEN IN RIGHT OF CANADA

DEFENDANT

Certificate Concerning Code of Conduct for Expert Witnesses

I, Paul Grootendorst, having been named as an expert witness by the Defendant, Her Majesty the Queen in Right of Canada, certify that I have read the Code of Conduct for Expert Witnesses set out in the schedule to the *Federal Courts Rules* and agree to be bound by it.

Date: February 5, 2014

Dr. Paul Grootendorst
Faculty of Pharmacy
University of Toronto
144 College Street, Room 601
Toronto, ON M5S 3M2
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Fax: (416) 978-1833

Court File No.: T-2030-13

FEDERAL COURT

BETWEEN:

NEIL ALLARD
TANYA BEEMISH
DAVID HEBERT
SHAWN DAVEY

PLAINTIFFS

AND:

HER MAJESTY THE QUEEN IN RIGHT OF CANADA

DEFENDANT

AFFIDAVIT OF JEANNINE RITCHOT
VOLUME I OF II (EXHIBITS A-C)

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