Estimating Potential Tissue Donors in Canada from 1995-2000: An Exploratory Analysis Based on Acute Care Hospital Admissions Data

Final Report
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Prepared by the Canadian Institute for Health Information for the Canadian Council for Donation and Transplantation

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Executive Summary

In early 2003, the Canadian Council for Donation and Transplantation (CCDT), upon the recommendation of the Donation Standing Committee, contracted with the Canadian Institute for Health Information (CIHI) to conduct a project to estimate the number of potential tissue donors in Canada. This project complements the work of the CCDT Donation Standing Committee which is looking at ways to eliminate the barriers that prevent opportunities for donor families who wish to donate the tissues and organs of their deceased family members to do so, and provides an estimate of potential tissue donors, which will be of value to tissue banks in their efforts to quantify donation rates. Potential tissue donors in the context of this report refer to patients who were identified as medically eligible to donate tissues based on the admitting diagnoses during the hospitalization in which they died.

The study sought to derive estimates of potential tissue donors in Canada and its provinces from administrative data on acute care hospital admissions. Deaths among patients admitted to acute care hospitals accounts for approximately half of all deaths in Canada. Potential tissue donors were defined on the basis of tissue type. Cornea/sclera (eye), skin, bone, soft/connective tissue, heart valve, femoral and saphenous vein donors were defined as persons who had died during their admission to an acute care hospital as per the inclusion-exclusion criteria elaborated further in the Methodology section of this report. Estimates of amniotic membrane[1] donors were based on estimates of women who underwent caesarean sections while hospitalized. Other living donors (autograft, bone marrow or surgical bone donors[2]) were **not** included in the study.

Given the limited amount of published research in the area of potential tissue donation, the starting point for the project was the development of an appropriate methodology. General tissue donor exclusions as well as detailed tissue-specific inclusion-exclusion criteria were developed. The criteria were based on the Canadian Standards Association guidelines (2003) on ocular and tissue donation as well as feedback from experts in the tissue-banking field.

Overall, 56% of all death discharges within acute care hospitals had one or more diagnoses included in the general exclusions. There were notable differences in the proportion of death discharges with the general exclusion diagnoses among the provinces. These differences are likely due to differences in institutional-based coding practices, demographics, and the health of the provincial populations, and were not explored in this report. Predictably, the tissue-specific donor estimates also varied substantially from province to province. The highest rates were found to exceed the lowest rates by 1.6 times. Both femoral vein estimates and the South Dakota Lions Eye Bank estimate for soft/connective tissue had the greatest range of difference between the highest and lowest rates.

Without taking into consideration consent for donation, the study found that there were an estimated 12,095 to 52,875 eye donors, yielding a maximum of 211,500 corneas and scleras. Voluntary C-sections was estimated to be in the range of 22,853 to 24,781 per year in Canada. Given an estimate of 20 to 30 grafts per membrane, this source of tissue could yield between 457,060 to 743,430 grafts.

[1] Amniotic membrane is the innermost layer of the placenta and used in different reconstructive surgeries, including cornea transplants.
[2] Surgical bone donors are typically patients who agree to donate their femoral heads after hip replacement surgeries.

Skin donors were estimated at between 2,386 and 34,597, bone (structural grafts) donors were estimated at between 2,386 and 33,673, and soft/connective tissue donors were estimated at between 1,544 and 4,850. The range of heart valve donors was estimated at 2,363 to 4,410 per year. The smallest group of potential donors was femoral vein donors, estimated to be between 663 and 1,503 donors per year. Saphenous veins donors were estimated at 3,476 and 4,533 per year.

This preliminary work when viewed in conjunction with other recent work on tissue supply and demand in Canada suggests that there are more than enough potential donors to meet the tissue needs, especially in light of the fact that the study was based on only those deaths occurring in acute care hospitals (i.e., the inclusion of deaths occurring in other locations would boost the potential). Estimates of eye donors, for example, may be increased in excess of 9,000 donors if facilities other than acute care hospitals were included. If the appropriate infrastructure was in place to identify potential donors, procure, and process tissues, it would appear that demands for tissue could be met from donors within Canada.

To round out this report, a cursory review of the limited literature on consent rates for tissue donation, and how these would impact the estimates, is provided. Provincial results of all estimates are detailed in the appendices of the report.

1. Introduction

1.1 Background

While organ donation has a high profile in the health care sector and among the general public, with most Canadians supporting organ donation in principle (Environics Research Group, 2001), tissue donation appears to have lower public awareness (Siminoff et al., 1994). This may be due to the fact that procedures involving tissue donation are often "life enhancing" rather than life preserving as are organ transplants (Odell et al., 1998).

Allograft tissue[3] is used in numerous and varied ways (see Appendix A). The quality of life of many Canadians is improved by tissue donation. For example, corneas are transplanted to restore sight to people with diseased or opaque corneas. Donated bone is used in a variety of orthopaedic procedures, repairing and correcting congenital, traumatic and skeletal disorders. People with valve defects and diseased or infected heart valves may have a heart valve replacement. Skin is used as a biological dressing for severely burned patients. Unlike organ donation, tissue donation does not require the brain death of the cadaveric donor. It is commonly noted by organ and tissue procurement organizations that more than 50 people can benefit from one organ-tissue donor.

The Donation Standing Committee of the Canadian Council on Donation and Transplantation (CCDT) has as its principle mandate to ensure that all individuals who wish to give a gift of organ and tissue donation have the opportunity to do so. The Committee is focusing on barriers to organ and tissue donation. This report provides a first step in establishing some numeric estimates of tissue donors. It details an exploratory approach to estimating the number of potential tissue donors who died during their admission to a Canadian acute care hospital. It excludes those people who died on arrival to or in emergency units (i.e., where patients were not formally admitted to hospital) as well as those people who died in chronic care facilities or other non-hospital facilities (e.g., convalescent homes, psychiatric hospitals, prisons, etc) and private residences. Potential tissue donors in the context of this report refers to patients who were identified as medically eligible to donate tissues based on their diagnoses during their final acute care hospitalization. Consent rates are not figured into this estimation.

1.2 Project Rationale

In early 2003, the Canadian Council for Donation and Transplantation (CCDT), upon the recommendation of the Donation Standing Committee, contracted with the Canadian Institute for Health Information (CIHI) to conduct a project to estimate the number of potential tissue donors in Canada. The importance of this project is that it:

- explores a potential methodology for estimating potential tissue donors
- provides an estimate of potential tissue donors, which will be of value to tissue banks in their efforts to quantify donation rates
- complements the work of the CCDT Donation Standing Committee which is looking at ways to eliminate the barriers that prevent opportunities for donor families who wish to donate the tissues and organs of their deceased family members to do so
- illustrates the extent to which tissue donation could be optimized when considered in conjunction with projections of tissue supply and demand in Canada. If there is insufficient supply of tissue within Canada to meet the current or projected demand as has been implicated in work completed by CIHI for the CCDT Tissue Committee,

[3] Tissue that is taken from one person's body and grafted to another person.

estimates of the number of potential tissue donors may help to ascertain the extent to which hospital-specific resources could be mobilized to meet these demands.
- complements the future work of the CCDT Tissue Committee by providing additional information of importance in the development of a functional business model to tissue banking and transplantation activities.

CIHI, with financial support from Clarica, had previously published a report on an exploratory approach to estimating potential organ donors (CIHI, 2001). Unlike the area of organ donation, there is a dearth of published literature in the area of tissue donation, particularly from North America. Furthermore, few researchers have investigated approaches to estimating tissue donor potentials. Jager et al. (1994) reported the earliest study looking at potential tissue donors in hospitals in the western part of the Netherlands. Using a medical record review methodology, the authors found that only a very small proportion of potential tissue donors became actual donors. Five years later, Garcia-Sousa et al. (1999) using a retrospective examination of hospital admissions and deaths in a large Catalan hospital found that 92% of all deaths satisfied the clinical criteria for selection of cornea donors. These studies suggest that available tissue donors are not limited in number, but that process barriers may prevent potential tissue donors from becoming actual ones.

The primary intent of the study is to derive estimates of potential tissue donors in Canada and its provinces from administrative data on hospital admissions. Potential tissue donors were defined on the basis of tissue type. Cornea/sclera (eye), skin, bone, soft/connective tissue, heart valve, femoral and saphenous vein donors were defined as persons who had died during their admission to an acute care hospital as per the inclusion-exclusion criteria elaborated further in the Methodology section of this report. Estimates of amniotic membrane[4] donors were based on estimates of women who underwent caesarean sections while hospitalized. Other living donors (autograft, bone marrow or surgical bone donors) were **not** included in the study.

Given the limited amount of published research in the area of potential tissue donation, the starting point for the project was the development of an appropriate methodology. Detailed tissue-specific inclusion-exclusion criteria were also developed. The criteria were based on the latest available Canadian guidelines on ocular and tissue donation as well as feedback from experts in the tissue-banking field. Various estimates of family consent for donation as reported in the published peer-reviewed literature are reviewed in the Discussion section and are applied to the resulting estimates.

1.3 Organization of Report

The major sections of this report are as follows:

- Introduction
- Methodology
- Findings
- Discussion

National and provincial estimates are provided for the following tissue types:

- Ocular
    - amniotic membrane
    - cornea/sclera

[4] Amniotic membrane is the innermost layer of the placenta and used in different reconstructive surgeries, including cornea transplants.

- Skin
- Musculoskeletal
    - bone
    - soft/connective tissue
- Cardiovascular
    - heart valve
    - femoral vein
    - saphenous vein

Detailed information for each province is reported in the appendices. Due to small numbers, Prince Edward Island is grouped with Nova Scotia, and the Territories are included within the Canadian totals and are not reported separately.

2. Methodology

2.1 Data Sources

This study used CIHI's Hospital Morbidity Database (HMDB) as its primary data source. HMDB captures information on patients separated through discharge or death from all acute care facilities in Canada. As such, it provides national data on acute care hospitalizations by diagnoses and procedures. Day procedures (e.g., day surgeries) and emergency department visits are not captured in this database. HMDB uses the 9th edition of the International Classification of Diseases (ICD-9) to capture diagnoses and the Canadian Classification of Procedures (CCP) to capture interventions. HMDB contains data from fiscal year 1994/95 up to 2000/01, inclusive. HMDB is the only national source of information on acute care hospitalizations. Data are routinely processed to minimize errors. An annual file is prepared for Statistics Canada, who in turn, subjects the data to other routine validation checks. The vast majority of data from HMDB come from the Discharge Abstract Database (DAD). An ongoing re-abstraction study on this database revealed an overall 6% variation in original coding and re-abstracted coding of diagnoses (CIHI, 2002).

General and tissue-specific inclusion-exclusion criteria were developed based on the Canadian Standards Association (CSA) guidelines for tissues for transplantation, ocular tissues for transplantation and general requirements (see CSA, 2003) as well as input from an ad hoc group of advisors from across Canada. The criteria are detailed in Appendix B. Members of the advisory group are listed in Appendix C. The general and tissue-specific diseases/conditions, which contraindicated tissue donation were mapped to ICD-9 diagnoses and/or CCP codes. In some cases, there were 3-digit matches; in some, cases 4-digit matches. The number of digits refers to the level of specificity of the diagnosis (e.g., herpetic septicaemia is a 4-digit match 054.5 whereas malaria is a 3-digit match 084, allowing all forms of non-congenital malaria to be included in the criteria).

The general exclusion criteria included a total of 29 conditions. In addition, two ICD-9 V-codes were included in the general exclusion criteria. The latter included codes noting that the patient: was a recipient of an organ or tissue transplant; and/or had received chemotherapy or teleradiotherapy during their admission. V-codes are supplementary codes denoting circumstances that influence a person's health status, but are not in themselves illnesses or injuries.

Tissue-specific estimates based on loose, mid-range and strict inclusion-exclusion criteria were developed for cornea/sclera, skin, bone, and heart valves on the basis of feedback from the advisory group. Soft/connective tissue estimates were based on a loose and mid-range criteria as well as one used by the South Dakota Lions Eye Bank. Estimates for femoral and saphenous veins were based on two sets of external criteria, one articulated by the South Dakota Lions Eye Bank and the other by the New England Organ Bank. The ad hoc advisory committee recommended the use of external criteria in the absence of established criteria in Canada. Estimates of amniotic membrane were based on criteria articulated by the Royal College of Ophthalmologists of London (UK). A range of estimates was decided as a means of dealing with the shortcomings inherent in this methodology approach.

Using CIHI's internal query and analysis application in conjunction with customized SAS programs, analyses were generated from the HMDB as follows:

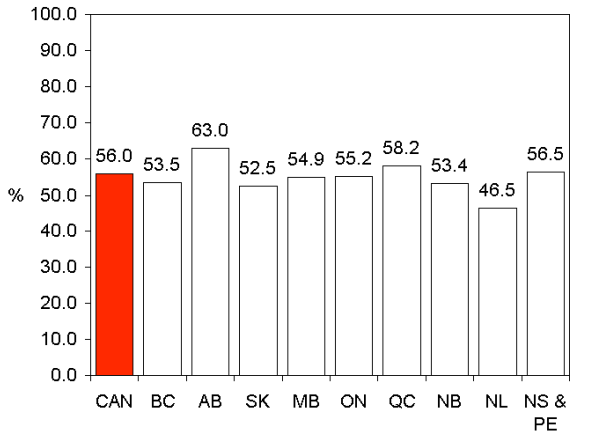
- Data used in the estimates were based on single acute care hospital admissions ending in death (i.e., includes deaths where autopsies were performed, not

performed, or where occurrence of an autopsy was unknown) or in the case of amniotic membrane, admissions involving C-section where the patients were discharged alive.
- Provincial figures were based on province of the admitting facility and not province of patients' residence. Out-of-province admissions were excluded for each facility.
- Discharge records with serious errors were excluded.
- Calendar years of discharge, from 1995 to 2000, were examined. Calendar year reporting is in keeping with international reporting conventions for organ donation.
- Diagnostic and procedural code inclusions-exclusions were applied to all available diagnoses and procedure codes, not just the most responsible diagnosis or the principle procedure.[5]
- For each tissue type, a range of estimates based on varying criteria was generated. Six-year averages were used in the calculation of the estimates.

2.2 Coding Variation

The Figure 1 below shows that 56% of all death discharges had one or more of the diagnoses included in the general exclusions. (Details are provided in Appendix D.)

Figure 1. Proportion of Acute Care Hospital Deaths with General Exclusion Diagnoses to All Deaths, Canada and Provinces, 1995-2000 (Six-year Average)



There were notable differences among the provinces. For example, the proportion of all deaths to death discharges from acute care hospitals ranged from a high of 57% in New Brunswick to a low of 47% in Alberta. (This may be related to different demographics – i.e., a younger population in Alberta.) The average number of diagnoses per death discharge ranged for a low of 4 in Saskatchewan and Newfoundland & Labrador to a high of 8 in Alberta. There were differences in the proportion of death discharges with certain diagnoses included in the general exclusions. For example, nearly 80% of death discharges in Quebec had malignant neoplasms compared with 50% in Newfoundland & Labrador.

Institutional-based coding practices, demographics and the health of the provincial populations likely account for these observed differences. For the purpose of this report,

[5] Up to 16 diagnoses and 10 procedures may be listed on a single discharge abstract.

Canadian figures averaged over six-years have been presented. Provincial differences are noted as a range.

2.3 Caveats

The following caveats apply to this research:

(1) The study is designed as exploratory.

Lacking a body of literature from which to derive a methodology to estimate potential tissue donors using administrative data, a methodology based on the existing guidelines and expert opinion is presented. The extent to which this methodology may accurately estimate the number of potential donors is unknown.

(2) Administrative data lacks detail and tends to inflate estimates by over-inclusion.

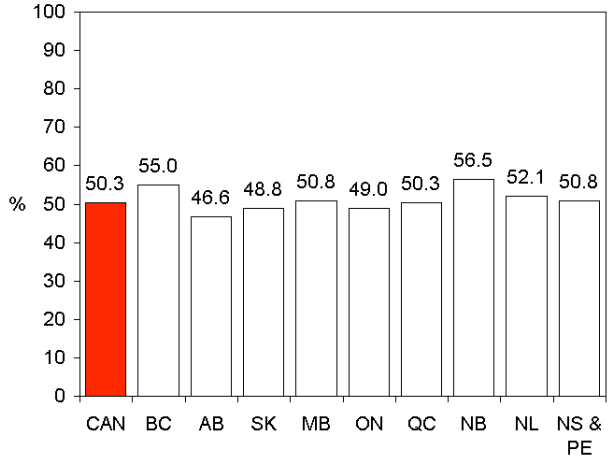
An administrative approach to estimating potential donors, either tissue or organ, is relatively quick and inexpensive to accomplish. Unfortunately, it has an inherent lack of precision, which leads to an over-inclusion of patients who would be excluded from consideration as donors given more detailed information as available in a medical record review. By way of example, it is very difficult to discern high-risk behaviours for infectious diseases, which would be used in the screening of prospective tissue donors. Many tissue banks, for example, exclude donors based on the presence of tattoos, body piercing, etc. The extent to which this kind of screening occurs nationally is not known.

To address the possible underestimate of serious infectious disease, a correction factor was applied to the resulting estimates. This correction factor was derived from prevalence data on HIV, hepatitis B, hepatitis C and Creutzfeldt-Jacob Disease (CKD) as noted in the peer-reviewed literature. These results are presented in the Discussion section of the report. The overall magnitude of overestimation in this report, however, is not known.

(3) The focus on acute care hospital deaths does not capture all deaths involving tissue donors and thus, will underestimate the number of potential tissue donors.

Approximately half of the people who died in Canada during the calendar years 1995 to 2000 died while admitted to an acute care hospital (see Figure 2; details in Appendix E). While the use of administrative data inflates estimates, the focus in this report on acute care hospital admissions also likely misses potential donors from other health care facilities. Schols and Berendschot-deLange (1999), for example, found that 25% of cognitively intact patients who died in nursing homes in 1995 in the Netherlands would have been suitable skin or cornea donors. The authors also found that over 80% of nursing home physicians and directors supported tissue donation in their nursing homes. The studies by Chopra et al. (1993), Long et al. (2000) and Garcia-Sousa et al. (1999) pointed out that emergency units are a relatively untapped source of prospective cornea donors. Although based on very small numbers, the study by Chopra et al. (1993) also suggests that consent rates may vary from families of patients who died in intensive care units or general wards versus emergency rooms, with the latter having a higher consent rate.

Figure 2. Proportion of Acute Care Hospital Deaths to All Deaths, Canada and Provinces, 1995-2000 (Six-year Average)



On the basis of preliminary data from CIHI's National Ambulatory Care Reporting System (NACRS), it is estimated that approximately 5-10% of all deaths in Canada occur in emergency rooms, with about 70% of these deaths occurring after arrival and the balance (30%) being deaths on arrival. Given approximately 216,000 deaths in Canada per year, an estimated 10,800 to 21,600 occur in emergency units. A crude analysis of these data looking at a breakdown of patient deaths by major admission category suggests that approximately 21% of patients would be excluded, an additional 8,532 to 17,064 potential tissue donors could be expected annually.

Data from CIHI's Ontario Chronic Care Patient System (OCCPS) showed a total 5,800 "deceased" discharges during 2000. This represents 7% of all deaths in Ontario for that year. Using an estimate of 5-10% for the entire country, approximately 10,800 to 21,600 deaths occur in chronic care facilities in Canada on an annual basis. Using an estimate of 50% to represent the proportion of patients cognitively intact in nursing homes and applying the finding of Schols and Berendschot-deLange (1999) that 25% of cognitively intact patients would be suitable skin or cornea donors, we could expect an additional 1,350 to 2,700 potential skin or cornea donors per year coming from chronic care facilities.

Figure 3 below shows the estimated distribution of deaths in Canada by location of death based on information from CIHI and Statistics Canada. This report looks at estimated potential donors from deaths occurring in acute care hospitals (white pie slice). "Other Facility" refers to deaths that may have occurred in other short-term care facilities, health care facilities, and institutions (e.g., convalescent homes, prisons, psychiatric hospitals). Given an average annual number of deaths in Canada of 216,000, this means that 108,000 deaths have not been evaluated for their potential as tissue donors in this study.

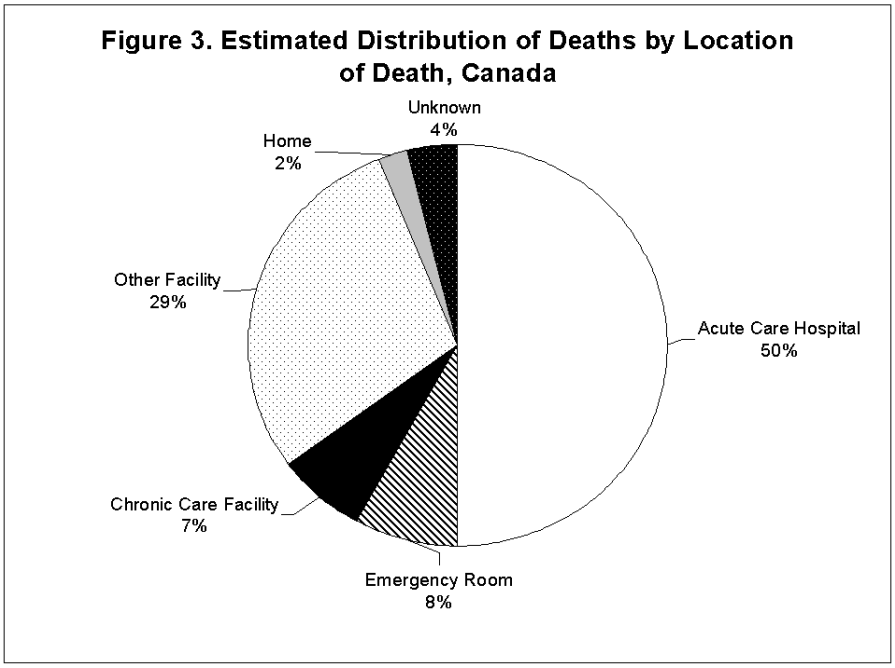


Figure 3. Estimated Distribution of Deaths by Location of Death, Canada
Unknown 4%
Home 2%
Other Facility 29%
Acute Care Hospital 50%
Chronic Care Facility 7%
Emergency Room 8%

3. Findings

The findings are presented according to tissue type. Detailed provincial data are provided in Appendix F.

3.1 Ocular

3.1.1 Amniotic Membrane

Amniotic membrane is retrieved from women who have given birth via elective caesarean section and then consent to donating the placenta. Given a lack of coding specificity regarding the elective nature of a C-section, estimates of potential amniotic membrane donors were computed in two ways:

(1) All women who had undergone a caesarean delivery (CCP codes 86.0-86.2, 86.8, 86.9) were included and then those who had diagnoses of syphilis, HIV/HTLV, viral hepatitis B or viral hepatitis C were excluded. A 39% rate of elective C-sections as reported by Wilkinson et al. (1998) was applied to this figure.

(2) Women with CCP codes indicating the caesarean procedure had been performed during their acute care hospital stay (CCP codes 86.0-86.2, 86.8, 86.9) along with either a caesarean delivery without mention of indication (ICD-9 code 669.7) or a previous C-section code (ICD-9 code 654.2) were included. The latter inclusion was related to the evidence that most repeat C-sections tend to be elective (Gregory et al., 1994). Those who had diagnoses of syphilis, HIV/HTLV, viral Hepatitis B or viral Hepatitis C during the C-section admission were excluded.

The first estimated number for all of Canada, averaged over six years, was 24,781. The second estimate was 22,881. The estimates are reasonably close, lending support to the second estimation method. See Table 1 for a summary. Provincial variation in terms of the second estimate ranged from 33.4% of all C-sections in Nova Scotia & Prince Edward Island to 37.5 of all C-sections in Saskatchewan.

Table 1. Amniotic Membrane: Estimated Potential Donors, Canada, 1995-2000

	Number*	Percent of C-sections
All C-sections (CCP codes 86.0-86.2, 86.8, 86.9)	63,608	100%
C-sections with exclusionary diagnoses	67	0.11%
Potential Donors – Estimate 1	24,781	39.0%
C-sections (CCP codes 86.0-86.2, 86.8, 86.9) with ICD-9 diagnoses of caesareans without mention of indication or history of previous caesarean	22,881	36.0%
C-sections as above with exclusionary diagnoses	28	0.04%
Potential Donors – Estimate 2	22,853	35.9%

**Based on a six-year average.*

3.1.2 Cornea/Sclera

A subset of the general exclusions along with additional exclusions was applied to derive the estimates of potential eye donors. The additional exclusions were: congenital rubella; carcinoma in situ of the eye; Reye's syndrome, and other eye disorders/diseases. Two V-codes were also used in the exclusion criteria: eye globe replaced by other means and lens replaced by other means. Three different age inclusions were used for the three estimates.

Loose Criteria

- Criteria included patients between the ages of 18 months to 80 years. Between 1995-2000, an average annual number of 71,030 patients between the ages of 18 months to 80 years died in Canada, which represents 65.4% of **all** acute care hospital deaths.
- 17,076 patients (24.0% of **included** deaths) were excluded because they had diseases/conditions, which precluded cornea/sclera donation.
- Between 1995-2000, there were an average annual number of 53,954 potential eye donors, which represents 76.0% of the included acute care hospital deaths and 49.7% of all acute care hospital deaths.

Mid-Range Criteria

- Criteria included patients between the ages of 2 and 70 years. Between 1995-2000, an average annual number of 36,719 patients between the ages of 2 to 70 died in Canada, which represents 33.8% of **all** acute care hospital deaths.
- 9,008 patients (24.5% of **included** deaths) were excluded because they had diseases/conditions, which precluded cornea/sclera donation.
- Between 1995-2000, there were an average annual number of 27,711 potential eye donors, which represents 75.5% of the included acute care hospital deaths and 25.5% of all acute care hospital deaths.

Strict Criteria

- Criteria included patients aged 2 to 60 years. Between 1995-2000, an average annual number of 16,869 patients between the ages of 2 to 60 died in Canada, which represents 15.5% of **all** acute care hospital deaths.
- 4,527 patients (26.8% of **included** deaths) were excluded because they had diseases/conditions, which precluded cornea/sclera donation.
- Between 1995-2000, there were an average annual number of 12,342 potential eye donors, which represents 73.2% of the included acute care hospital deaths and 11.4% of all acute care hospital deaths.

For a summary, see Table 2 below.

Table 2. Cornea/Sclera: Estimated Potential Donors, Canada, 1995-2000

	Number*	Percent of All Deaths (Provincial Range)
All Acute Care Hospital Deaths	108,549	100%
Included Deaths based on:		
• Loose Criteria age range (18 mos-80 yrs)	71,030	65.4%
• Mid-Range Criteria age range (2-70 yrs)	36,719	33.8%
• Strict Criteria age range (2-60 yrs)	16,869	15.5%
Estimated Potential Donors (age inclusions without diagnostic exclusions):		
• Loose Criteria	53,954	65.4% (46.0-57.6%)
• Mid-Range Criteria	27,711	25.5% (22.3-29.5%)
• Strict Criteria	12,342	11.4% (9.7-13.2%)

**Based on a six-year average.*

The lower range of estimated eye donors (range of 16% to 65% of all acute care hospital deaths) is consistent with the findings by Chopra et al. (1993) (i.e., that 30% of all hospital deaths resulted in eye donations), but lower than the study by Garcia-Sousa et al. (1999), which was also based on a methodology that utilized hospitalization records. These authors concluded that 92% of all deaths satisfied the clinical criteria for selection of cornea donors.

3.2 Skin

In addition to the 29 general exclusion conditions, additional exclusions were applied. These were: leprosy/Hansen's disease; herpes simplex; skin infections; pemphigus, bullous pemiphigoid; urticaria/atopic dermatitis with the presence of asthma; and acute burns. These additional exclusions translated into four 4-digit and eleven 3-digit level ICD-9 codes. Three different age inclusions were used for the three estimates.

Loose Criteria

- Criteria included patients aged 12 to 85 years. Between 1995-2000, an average annual number of 87,960 patients between the ages of 12 to 85 died in Canada, which represents 81.0% of **all** acute care hospital deaths.
- 52,657 patients (59.9% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding skin donation.
- Between 1995-2000, there were an average annual number of 35,303 potential skin donors, which represents 40.1% of the included acute care hospital deaths and 32.5% of all acute care hospital deaths.

Mid-Range Criteria

- Criteria included patients aged 16 to 65 years. Between 1995-2000, an average annual number of 24,283 patients between the ages of 16 to 65 died in Canada, which represents 22.4% of **all** acute care hospital deaths.
- 16,884 patients (69.5% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding skin donation.
- Between 1995-2000, there were an average annual number of 7,399 potential skin donors, which represents 30.5% of the included acute care hospital deaths and 6.8% of all acute care hospital deaths.

Strict Criteria

- Criteria included patients aged 16 to 50 years. Between 1995-2000, an average annual number of 7,481 patients between the ages of 16 to 50 died in Canada, which represents 6.9% of **all** acute care hospital deaths.
- 5,046 patients (67.4% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding skin.
- Between 1995-2000, there were an average annual number of 2,435 potential skin donors, which represents 32.6% of the included acute care hospital deaths and 2.2% of all acute care hospital deaths.

See Table 3 below for a summary.

Table 3. Skin: Estimated Potential Donors, Canada, 1995-2000		
	Number*	Percent of All Deaths (Provincial Range)
All Acute Care Hospital Deaths	108,549	100%
Included Deaths based on:		
• Loose Criteria age range (12-85 yrs)	87,961	81.0%
• Mid-Range Criteria age range (16-65 yrs)	24,283	22.4%
• Strict Criteria age range (16-50 yrs)	7,481	6.9%
Estimated Potential Donors (age inclusions without diagnostic exclusions):		
• Loose Criteria	35,303	32.5% (26.3-42.7%)
• Mid-Range Criteria	7,399	6.8% (5.8-9.0%)
• Strict Criteria	2,435	2.2% (1.8-3.3%)

**Based on a six-year average.*

3.3 Musculoskeletal

3.3.1 Bone

In addition to the 29 general exclusion conditions, additional exclusions were applied. These were: leprosy/Hansen's disease; scarcoidosis; amyloidoisis; polyarteritis nodosa; rheumatoid arthritis; osteomyelitis; and clinically significant metabolic bone disease. These additional exclusions translated into seven 4-digit and five 3-digit level ICD-9 codes. Three different age inclusions were used for the three estimates.

Loose Criteria

- Criteria included patients aged 12 to 85 years. Between 1995-2000, an average annual number of 87,961 patients between the ages of 12 to 85 died in Canada, which represents 81.0% of **all** acute care hospital deaths.
- 53,601 patients (60.9% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding bone donation.
- Between 1995-2000, there were an average annual number of 34,360 potential bone donors, which represents 39.1% of the included deaths and 31.7% of all acute care hospital deaths.

Mid-Range Criteria

- Criteria included patients aged 16 to 65 years. Between 1995-2000, an average annual number of 24,283 patients between the ages of 16 to 65 died in Canada, which represents approximately 22.4% of **all** acute care hospital deaths.
- 16,985 patients (69.9% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding bone donation.
- Between 1995-2000, there were an average annual number of 7,298 potential bone donors, which represents 30.1% of the included deaths and 6.7% of all acute care hospital deaths.

Strict Criteria

- Criteria included patients aged 16 to 50 years. Between 1995-2000, an average annual number of 7,481 patients between the ages of 16 to 50 died in Canada, which represents 6.9% of **all** acute care hospital deaths.
- 5,047 patients (67.5% of the **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding bone donation.
- Between 1995-2000, there were an average annual number of 2,434 potential bone donors, which represents 32.5% of the included deaths and 2.2% of all acute care hospital deaths.

See Table 4 for a summary of the estimates of potential bone donors.

Table 4. Bone: Estimated Potential Donors, Canada, 1995-2000

	Number*	Percent of All Deaths (Provincial Range)
All Acute Care Hospital Deaths	108,549	100%
Included Deaths based on:		
• Loose Criteria age range (12-85 yrs)	87,961	81.0%
• Mid-Range Criteria age range (16-65 yrs)	24,283	22.4%
• Strict Criteria age range (16-50 yrs)	7,481	6.9%
Estimated Potential Donors (age inclusions without diagnostic exclusions):		
• Loose Criteria	34,360	31.7% (25.1-42.2%)
• Mid-Range Criteria	7,298	6.7% (5.7-8.9%)
• Strict Criteria	2,434	2.2% (1.8-3.3%)

**Based on a six-year average.*

3.3.2 Soft/Connective Tissue

In addition to the 29 general exclusion conditions, additional exclusions were applied to the loose and mid-range estimates. These were: leprosy/Hansen's disease; scarcoidosis; amyloidoisis; polyarteritis nodosa; pemphigus; bullous pemiphigoid; and osteomyelitis. These additional exclusions translated into four 4-digit and four 3-digit level ICD-9 codes. The strict criteria had the general exclusions, the exclusions applied to the loose and mid-range estimates and an additional list of exclusionary criteria, which included: Goodpasture's syndrome; diabetes mellitus; automimmune hemolytic anemia; autoimmune thrombocytopenic purpura; primary biliary cirrhosis; other endocrine gland failure; and vasculitis. These additional exclusions translated into six 4-digit and six 3-digit level ICD-9 codes. Three different age inclusions were used for the three estimates.

Loose Criteria

- Criteria included patients aged 15 to 60 years. Between 1995-2000, an average annual number of 16,491 patients between the ages of 15 to 60 died in Canada, which represents 15.2% of **all** acute care hospital deaths.
- 11,542 patients (70.0% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding soft/connective tissue donation.
- Between 1995-2000, there were an average annual number of 4,949 potential soft/connective tissue donors, which represents of 30.0% included deaths and 4.6% of all acute care hospital deaths.

Mid-Range Criteria

- Criteria included patients aged 16 to 50 years. Between 1995-2000, an average annual number of 7,481 patients between the ages of 16 to 50 died in Canada, which represents 6.9% of **all** acute care hospital deaths.
- 5,057 patients (67.6% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 7 additional diseases/conditions precluding soft/connective tissue donation.
- Between 1995-2000, there were an average annual number of 2,424 potential soft/connective tissue donors, which represents 32.4% of included deaths and 2.2% of all acute care hospital deaths.

Strict Criteria (as per the South Dakota Lions Eye Bank)

- Criteria included patients aged 12 to 45 years. Between 1995-2000, an average annual number of 4,934 patients between the ages of 12 to 45 died in Canada, which represents 4.5% of **all** acute care hospital deaths.
- 3,358 patients (68.1% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or 14 additional diseases/conditions precluding soft/connective tissue donation.
- Between 1995-2000, there were an average annual number of 1,576 potential soft/connective tissue donors, which represents 31.9% of included deaths and 1.5% of all acute care hospital deaths.

A summary of the estimates for soft/connective tissue is presented in Table 5.

Table 5. Soft/Connective Tissue: Estimated Potential Donors, Canada, 1995-2000

	Number*	Percent of All Deaths (Provincial Range)
All Acute Care Hospital Deaths	108,549	100%
Included Deaths based on:		
• Loose Criteria age range (15-60 yrs)	16,491	15.2%
• Mid-Range Criteria age range (16-60 yrs)	7,481	6.9%
• South Dakota Lions Eye Bank age range (12-45 yrs)	4,934	4.5%
Estimated Potential Donors (age inclusions without diagnostic exclusions):		
• Loose Criteria	4,949	4.6% (3.8-6.0%)
• Mid-Range Criteria	2,424	2.2% (1.8-3.3%)
• South Dakota Lions Eye Bank Criteria	1,576	1.5% (1.1-2.3%)

**Based on a six-year average.*

3.4 Cardiovascular

3.4.1 Heart Valve

In addition to the 28 general exclusion conditions for all the three estimates, newborns with immaturity/low birth weight (ICD-9 codes 760-779) were excluded. For the loose and mid-range estimates, the following diseases/conditions were also excluded: Chagas disease; Hashimoto's thyroiditis; Goodpasture's syndrome; pemphigus; Graves disease; myasthenia grave; autoimmune hemolytic anemia; autoimmune thrombocytopenic purpura; rheumatoid arthritis; idiopathic Addison's disease; glomeruloephritis; bullous pemiphigoid; diabetes mellitus; vitiligo; vasculitis; urticaria/atopic dermatitis with asthma; Wegner's granulomatosis; Marfan's syndrome; rheumatic fever; history of mitral valve disease/prolapse; semilunar valvular disease; cardiomyopathy or viral or idiopathic etiology. These additional exclusions translated into 25 4-digit and 16 3-digit level ICD-9 codes. The strict criteria had the general exclusions with the immaturity/low birth weight exclusion, the exclusions applied to the loose and mid-range estimates and an additional list of exclusionary criteria, which included three 4-digit ICD-9 codes (pernicious anemia; primary biliary cirrhosis; post MI cardiotomy syndrome), one 3-digit level ICD-9 code (other endocrine gland failure) and 2 CCP codes (cardiac defibrillations; closed chest massage). Three different age inclusions were used for the three estimates.

Loose Criteria

- Criteria included newborn patients to patients aged 60 years. Between 1995-2000, an average annual number of 18,520 patients between the ages of 0 to 60 died in Canada, which represents 17.1% of **all** acute care hospital deaths.
- 14,020 patients (75.7% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions, exclusions related to low birth weight/immaturity and/or the additional 41 conditions precluding heart valve donation.

- Between 1995-2000, there were an average annual number of 4,500 potential heart valve donors, which represents 24.3% of the included deaths and 4.1% of all acute care hospital deaths.

Mid-Range Criteria
- Criteria included newborn patients to patients aged 55 years. Between 1995-2000, an average annual number of 13,296 patients between the ages of 0 to 55 died in Canada, which represents 12.2% of **all** acute care hospital deaths.
- 9,902 patients (74.5% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions, exclusions related to low birth weight/immaturity and/or the additional conditions precluding heart valve donation.
- Between 1995-2000, there were an average annual number of 3,394 potential heart valve donors, which represents 25.5% of the included deaths and 3.1% of all acute care hospital deaths.

Strict Criteria
- Criteria included newborn patients to patients aged 50 years. Between 1995-2000, an average annual number of 9,551 patients between the ages of 0 to 50 died in Canada, which represents 8.8% of **all** acute care hospital deaths.
- 7,140 patients (74.8% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions, exclusions related to low birth weight/immaturity and/or the additional conditions precluding heart valve donation, including 2 procedural codes relating to cardiac defibrillations and closed chest massage.
- Between 1995-2000, there were an average annual number of 2,411 potential heart valve donors, which represents 25.2% of the included deaths and 2.2% of all acute care hospital deaths.

See Table 6 below for a summary of the heart valve findings.

Table 6. Heart Valve: Estimated Potential Donors, Canada, 1995-2000

	Number*	Percent of All Deaths (Provincial Range)
All Acute Care Hospital Deaths	108,549	100%
Included Deaths based on:		
• Loose Criteria age range (Newborn-60 yrs)	18,520	17.1%
• Mid-Range Criteria age range (Newborn-55 yrs)	13,296	12.2%
• Strict Criteria age range (Newborn-50 yrs)	9,551	8.8%
Estimated Potential Donors (age inclusions without diagnostic exclusions):		
• Loose Criteria	4,500	4.1% (3.3-5.7%)
• Mid-Range Criteria	3,394	3.1% (2.5-4.4%)
• Strict Criteria	2,411	2.2% (1.9-3.0%)

**Based on a six-year average.*

3.4.2 Femoral Vein

Two sets of criteria were based on those published by two US tissue banks that retrieve femoral veins: the New England Organ Bank and the South Dakota Lions Bank. These banks report different criteria based on donor age and sex. In addition to the general exclusions, patients who died with diseases of the veins (6 3-digit level ICD-9 codes) were excluded from consideration as potential tissue donors.

New England Organ Bank Criteria

- Criteria included males between the ages of 17-39 years. Between 1995-2000, an average annual number of 1,583 males between the ages of 17-39 died in Canada, which represents 1.5% of **all** acute care hospital deaths.
- 906 patients (57.2% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or diseases of the vein.
- Between 1995-2000, there were an average annual number of 677 potential femoral vein donors, which represents 42.8% of the included deaths and 0.6% of all acute care hospital deaths.

South Dakota Lions Bank Criteria

- Criteria included females between the ages of 15-29 years and males between the ages of 15-49 years. Between 1995-2000, an average annual number of 4,164 patients died in Canada, which represents 3.8% of **all** acute care hospital deaths.
- 2,630 patients (63.2% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or diseases of the vein.
- Between 1995-2000, there were an average annual number of 1,534 potential femoral vein donors, which represents 36.8% of the included deaths and 1.4% of all acute care hospital deaths.

Table 7. Femoral Vein: Estimated Potential Donors, Canada, 1995-2000

	Number*	Percent of All Deaths (Provincial Range)
All Acute Care Hospital Deaths	108,549	100%
Range of Included Deaths based on age-gender criteria: • New England Organ Bank • South Dakota Lions Eyes Bank	 1,583 4,164	 1.5% 3.8%
Range of Estimated Potential Donors (inclusions without diagnostic exclusions): • New England Organ Bank Criteria • South Dakota Lions Eyes Bank Criteria	 677 1,534	 0.6% (0.4-1.1%) 1.4% (1.1-2.3%)

**Based on a six-year average.*

3.4.3 Saphenous Vein

Two sets of criteria were based on those published by two US tissue banks that retrieve saphenous veins: the New England Organ Bank and the South Dakota Lions Bank. These banks report different criteria based on donor age and sex. In addition to the general exclusions, patients who died with diseases of the veins (6 3-digit level ICD-9 codes) were excluded from consideration as potential tissue donors.

New England Organ Bank Criteria

- Criteria included females between the ages of 17-49 years and males between the ages of 17-59 years. Between 1995-2000, an average annual number of 11,596 patients died in Canada, which represents 10.7% of **all** acute care hospital deaths.
- 8,049 patients (69.4% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or diseases of the vein.
- Between 1995-2000, there were an average annual number of 3,547 potential saphenous vein donors, which represents 30.6% of the included deaths and 3.3% of all acute care hospital deaths.

South Dakota Lions Bank Criteria

- Criteria included females between the ages of 15-29 years and males between the ages of 16-65 years. Between 1995-2000, an average annual number of 14,330 patients died in Canada, which represents 13.2% of **all** acute care hospital deaths.

- 9,704 patients (67.7% of **included** deaths) were excluded because they had diseases/conditions within the general exclusions and/or diseases of the vein.
- Between 1995-2000, there were an average annual number of 4,626 potential femoral vein donors, which represents 32.3% of the included deaths and 4.3% of all acute care hospital deaths.

Table 8. Saphenous Vein: Estimated Potential Donors, Canada, 1995-2000		
	Number*	Percent of All Deaths (Provincial Range)
All Acute Care Hospital Deaths	108,549	100%
Range of Included Deaths based on age-gender criteria: • New England Organ Bank • South Dakota Lions Eyes Bank	 11,596 14,330	 10.7% 13.2%
Range of Estimated Potential Donors (inclusions without diagnostic exclusions): • New England Organ Bank Criteria • South Dakota Lions Eyes Bank Criteria	 3,547 4,626	 3.3% (2.7-4.6%) 4.3% (3.4-5.6%)

**Based on a six-year average.*

3.5 Provincial Variation

A summary of the data on estimated potential cadaveric tissue donors by donor type is provided in Table 9 below. Overall, estimated potential tissue donors in British Columbia and Newfoundland and Labrador tended to represent proportionately more of provincial deaths than the other provinces. The proportion of donors to all deaths tended to be lower in Alberta, Manitoba and Nova Scotia & Prince Edward Island. The highest rates were found to exceed the lowest rates by 1.6 times. Both femoral vein estimates and the South Dakota Lions Eye Bank estimate for soft/connective tissue had the greatest range of difference between the highest and lowest rates.

Table 9. Tissue-specific Estimates of Potential Donors, Provinces, 1995-2000

	Province*								
	BC	AB	SK	MB	ON	QC	NB	NL	NS&PE
Acute care hospital admissions resulting in deaths	15,102	7,766	4,296	4,928	39,231	26,972	3,412	2,161	4,578
Cornea/Sclera – loose	7,676	3,574	2,055	2,266	18,547	14,553	1,755	1,244	2,222
% of all deaths	50.83	46.02	47.84	45.98	47.28	53.96	51.43	57.57	48.54
Cornea/Sclera – mid-range	3,981	1,914	986	1,097	9,285	7,781	873	638	1,116
% of all deaths	26.36	24.65	22.95	22.26	23.67	28.85	25.58	29.53	24.38
Cornea/Sclera – strict	1,918	934	436	480	4,007	3,397	376	285	490
% of all deaths	12.70	12.03	10.15	9.74	10.21	12.59	11.02	13.19	10.70
Skin – loose	5,295	2,042	1,421	1,584	12,727	8,696	1,161	922	1,420
% of all deaths	35.06	26.29	33.08	32.14	32.44	32.24	34.02	42.67	31.02
Skin – mid-range	1,247	480	276	285	2,526	1,905	208	195	269
% of all deaths	8.26	6.18	6.42	5.78	6.44	7.06	6.10	9.02	5.88
Skin – strict	494	187	100	92	773	580	69	58	80
% of all deaths	3.27	2.41	2.33	1.87	1.97	2.15	2.03	2.68	1.75
Bone – loose	5,190	1,950	1,396	1,541	12,445	8,372	1,134	911	1,388
% of all deaths	34.37	25.11	32.50	31.27	31.72	31.04	33.23	42.16	30.32
Bone – mid-range	1,234	470	274	280	2,499	1,869	205	193	264
% of all deaths	8.17	6.05	6.38	5.68	6.37	6.93	6.01	8.93	5.77

Table 9. Tissue-specific Estimates of Potential Donors, Provinces, 1995-2000

	Province*								
	BC	AB	SK	MB	ON	QC	NB	NL	NS&PE
Bone – strict	494	186	100	91	775	579	68	57	81
% of all deaths	3.27	2.40	2.33	1.85	1.98	2.15	1.99	2.64	1.77
Soft/connective tissue – loose	902	346	187	188	1,647	1,239	137	124	172
% of all deaths	5.97	4.46	4.35	3.82	4.20	4.59	4.02	5.74	3.76
Soft/connective tissue – mid-range	492	187	100	91	768	577	68	58	80
% of all deaths	3.26	2.41	2.33	1.85	1.96	2.14	1.99	2.68	1.75
Soft/connective tissue – South Dakota Lions Eye Bank	353	129	68	57	482	358	42	34	50
% of all deaths	2.34	1.66	1.59	1.15	1.23	1.33	1.24	1.58	1.10
Heart valve – loose	854	334	187	160	1,464	1,099	119	116	159
% of all deaths	5.65	4.30	4.35	3.25	3.73	4.07	3.49	5.37	3.47
Heart valve – mid-range	663	263	149	122	1,085	814	90	84	121
% of all deaths	4.39	3.39	3.47	2.48	2.77	3.02	2.64	3.90	2.64
Heart valve – strict	448	192	107	91	790	569	63	60	86
% of all deaths	2.97	2.47	2.50	1.85	2.01	2.11	1.85	2.78	1.88
Femoral vein – New England Organ Bank	167	57	30	24	197	152	19	11	20
% of all deaths	1.11	0.73	0.70	0.49	0.50	0.56	0.56	0.51	0.43
Femoral vein – South Dakota Lions Eye Bank	343	116	63	54	469	359	45	33	49
% of all deaths	2.27	1.49	1.47	1.10	1.20	1.33	1.32	1.53	1.07
Saphenous vein – New England Organ Bank	691	256	142	132	1,145	866	98	89	124
% of all deaths	4.58	3.30	3.31	2.68	2.92	3.21	2.87	4.12	2.71
Saphenous vein – South Dakota Lions Eye Bank	843	300	178	168	1,542	1,178	127	116	168
% of all deaths	5.58	3.86	4.14	3.41	3.93	4.37	3.72	5.37	3.67

**Territories are excluded because of small cell sizes. Minimum and maximum values for proportions are noted in blue and red, respectively, in the electronic version of this report.*

4. Discussion

This section is divided into three sections. The first provides an estimated correction factor to apply to the estimates presented in the Findings section in an attempt to address the problem of over-inclusion inherent in the methodology. In the second section, a brief review of the literature on consent rates is presented along with an application of the consent rates on the resulting corrected estimates. The final section aims to tie together information on the supply and demand of allograft tissue in Canada with the estimates of tissue potential from the Findings section. Suggested process improvements round out this section.

4.1 Correction Factor for Over-Inclusion of Cadaveric Donors

The data presented in Table 10 shows the average annual proportion of all patients who died in acute care hospitals during the calendar years 1995 to 2000 and had the following conditions: HIV, hepatitis B, hepatitis C and Creutzfeldt-Jakob disease. Adjacent to these numbers are estimates of prevalence rates of these conditions in similar populations from the available literature. The correction factor is estimated at 2% (i.e., 438+865+845=2,148, which is 1.98% of all acute care hospital deaths 108,549).

Table 10. Estimation of Over-Inclusion based on Prevalence of HIV, Hepatitis B, Hepatitis C and CJD

	Number in HMDB*	Percent of Acute Care Hospital Deaths	Prevalence Estimates Reported in Literature	Corrected Estimates
Patients Who Died with a diagnosis of HIV	648	0.6%	0.6% (Long et al., 1992); 0.43% (Remis et al., 2001); 1.27% (Houston et al., 2000)	Apply 1.0% to all deaths (n=1086). This will increase number of excluded patients by 438.
Patients Who Died with a diagnosis of Hepatitis B	221	0.2%	2.1% (Long et al., 1992); 0.5%-1.0% (Sherman, 1995)	Apply 1.0% (n=1086), which will increase number of excluded patients by 865.
Patients Who Died with a diagnosis of Hepatitis C	23	0.02%	0.5% (Long et al., 1992); 0.8% (Zou et al., 2001); 0.5%-1.0% (Sherman, 1995)	Apply 0.8% (n=868), which will increase number of excluded patients by 845.
Patients Who Died with a diagnosis of Creutzfeldt-Jakob Disease	27	0.03%	0.003% (Kennedy et al., 2001)	None.

**Based on a six-year average.*

This correction factor has been applied to all the summary data provided in section 3.1 and is presented in Table 11 below.

Table 11. Application of Correction for Over-Inclusion			
	Original Estimates*	Correction Factor Applied	Percent of All Deaths**
Cornea/Sclera: Potential Donors			
• Loose	53,954	52,875	48.7
• Mid-Range	27,711	27,157	25.0
• Strict	12,342	12,095	11.1
Skin: Potential Donors			
• Loose	35,303	34,597	31.9
• Mid-Range	7,399	7,251	6.7
• Strict	2,435	2,386	2.2
Bone: Potential Donors			
• Loose	34,360	33,673	31.0
• Mid-Range	7,298	7,152	6.6
• Strict	2,434	2,389	2.2
Soft/connective tissue: Potential Donors			
• Loose	4,949	4,850	4.5
• Mid-Range	2,424	2,376	2.2
• South Dakota Lions Eye Bank	1,576	1,544	1.4
Heart valve: Potential Donors			
• Loose	4,500	4,410	4.1
• Mid-Range	3,394	3,326	3.1
• Strict	2,411	2,363	2.2
Femoral Vein: Potential Donors			
• New England Organ Bank	677	663	0.6
• South Dakota Lions Bank	1,534	1,503	1.4
Saphenous Vein: Potential Donors			
• New England Organ Bank	3,547	3,476	3.2
• South Dakota Lions Bank	4,626	4,533	4.2

**Based on a six-year average.*
***There were 108,549 acute care hospital deaths.*

4.2 Application of Consent Rates

Summary of Literature on Consent Rates for Tissue Donation

Ranges of tissue-specific and general tissue donation consent rates were estimated based on the available literature as summarized below. (An overview is provided in Appendix G.) There are no Canadian studies available at present in the peer-reviewed literature so it is unknown to what extent this literature reflects the Canadian reality. Application of the estimated consent rates is applied in Table 12. The estimates are based on a 100% approach rate of donor families.

Cornea/Eye Donation

- Chopra et al. (1993) reported that 89% of potential donor families were approached for consent regarding cornea donation and that 66% of those approached consented to donate. The overall procurement ratio of donors to deaths was 3:10.
- Gain et al. (2002), in a study conducted in France, found that 52% of families of prospective cornea donors consented to donate when contacted by telephone; 82% when contacted in face-to-face interviews. Another recent French study by Muraine et al. (2002) found that the low rate of cornea donation was more related to logistical issues rather than low consent.
- Muraine et al. (2000) found rates of consent for cornea donation to be 72% when a well-trained and motivated hospital staff managed consent requests. Prospective

cornea donor families were approached only 38% of the time; the consent among those approached was 71%.
- A very recent study from France reported a consent rate of 45% for cornea donation (Noury et al., 2003).
- Carrey et al. (2000) found an 82% family consent rate. These authors reported that while 41% of patients who died in hospital were not assessed by the transplant coordinator/ophthalmologist, 48% of these patients were potential cornea donors as determined from medical record review.
- Krieglstein et al. (2002) found a 67% familial consent rate for cornea donation. An earlier, smaller scale study found a 73% consent rate (Krieglstein et al., 2001).
- Heng et al. (2001), in a study of eye donation from 62 hospitals in Pennsylvania before and after the enactment of routine referral legislation, found that family consent rate dropped in half, from 48% to 24% during the 6-year period, 1993 to1998.
- Siminoff et al. (1995) in a large-scale, in-depth chart review study of a sample of 23 acute care general hospitals in 2 metropolitan US locations found that 83% of health care professionals correctly identified donor-eligible patients. Families of donor-eligible patients were more likely to be approached about organ donation (87%) than tissue (70%) or cornea (67%) donation. Of the families approached, 35% agreed to donate tissues and 24% agreed to donate corneas. This was lower than an earlier and smaller scale study by Siminoff et al. (1994), which reported a 29.6% consent rate for tissue and cornea donation. The families of 65.9% of eligible tissue/cornea donors were approached.

Heart Valve
- Haire and Hinchliff (1996) reported a consent rate of 81% among families approached to donate their family members' heart valve at coronial autopsies in an Australian tertiary referral hospital in the first half of the 1990s.

General Tissue Donors
- Beard et al. (2002) reported a consent rate of 51% for tissue donation.

Table 12. Estimates of Consenting Potential Tissue Donors by Tissue Type

Tissue Type	Estimated Potential Donors* (Number)	Consent Rate Range**	Consented Tissue Donors (Number)
Amniotic Membrane	22,853-24,781	1-10%	228-2,478
Cornea/Sclera	12,095-52,875	24% - 82%	2,903-43,358
Skin	2,386-34,597	35% - 51%	835-17,644
Bone	2,389-33,673	35% - 51%	840-17,173
Soft/connective tissue	1,544-4,850	35% - 51%	540-2,474
Heart valve	2,363-4,410	45% - 81%	1,063-3,572
Femoral Vein	663-1,503	45% - 51%	298-767
Saphenous Vein	3,476-4,533	45% - 51%	1,564-2,312

**Estimates of potential donors applies 2% correction factor as determined in Section 4.1.*
***Consent rates were based on available literature as summarized. Where a tissue-specific result was not available, a best-guess estimate was applied. Assumes that 100% of donor families were approached regarding consent to donate tissue.*

4.3 Assessing Potential Relative to Need

To put the results within the context of the work done on behalf of the CCDT Tissue Standing Committee, results were drawn from the two reports:
Supply of Human Allograft Tissue in Canada (CIHI, 2003) and *Demand of Human Allograft Tissue in Canada* (CIHI, 2003). Table 13 highlights how the potential tissue as

estimated in this report meets the Canadian need for tissue.[6] These very preliminary data, even in light of the previously mentioned caveats, suggest that tissue donation in Canada could be optimized to meet the demand.

Table 13. Potential Tissue Donors to Canadian Need

Tissue Type	Potential Donors*	Potential Tissue**	Supply***	Demand****	Potential to Need
Ocular Tissue • Eye	12,095-52,875	12,095-211,500 cornea 12,095-211,500 sclera	3,387	3,391-4,430	More than sufficient if eye retrieval optimized.
• Amniotic Membrane	22,853-24,781	457,060-743,430	3		Potential amniotic membrane supply is large.
Skin	2,386-34,597	2,386-103,791	2,210	1,614	Already sufficient.
Bone (Structural Grafts)	2,389-33,673	19,112-673,460	1,957	3,724-6,598	Sufficient if consent optimized
Soft/Connective Tissue	1,544-4,850	1,544-29,100	882	1,931-3,459	Sufficient if consent optimized
Heart Valves	2,363-4,410	2,363-17,640	249	1,089-1,643	Sufficient if retrieval optimized
Femoral Veins	663-1,503	663-6,012	Not retrieved	Not available	Unknown
Saphenous Veins	3,476-4,533	3,476-18,132	Not retrieved	Not available	Unknown

**Based on corrected estimates. Consent rates are not factored in.*
***The following factors were applied to the lowest and highest estimates: cornea/sclera=1 and 4; amniotic membrane =20 and 30 (Royal College of Ophthalmologists of London (2000); skin = 1 and 3; bone = 8 and 20; soft/connective tissue = 1 and 6; heart valves = 1 and 4; femoral/saphenous veins = 1 and 4.*
****Based on processed tissue volume. Source: CIHI (2003). Supply of Human Allograft Tissue in Canada.*
*****Based on projected demand across surgical specialties. Source: CIHI (2003). Demand of Human Allograft Tissue in Canada.*

4.4 Conclusions

Although the published literature on tissue donation is limited, it does suggest some key areas for attention. These are consistent with the literature on improving organ donation rates and include:

- Improving processes to eliminate logistical barriers that prevent the identification of potential tissue donors and the contacting of family members (Carrey et al., 2000; Muraine et al., 2002)
- Having an informed, well-trained and dedicated staff in place (Chopra et al., 1993; Muraine et al. 2000; Siminoff et al., 1994)
- Permitting sufficient time for families to consider the tissue donation request (Muraine et al., 2002)
- Using face-to-face interviews with families as a mechanism to optimize consent rates (Gain et al., 2002[7]; Muraine et al., 2000)

[6] The Supply and Demand reports completed for the CCDT Tissue Standing Committee were based on all allograft tissue, not necessary just those from cadaveric donors. Some liberties have been taken with the numbers reported in Table 13 so that they are more applicable to cadaveric tissue donors.

[7] Gain et al. (2002) indicated that while face-to-face interviews do optimize consent rates, telephone consent rates were almost 50% and may be feasible with limited resources.

- Optimizing opportunities for tissue donation across the hospital (Garcia-Sousa, et al., 1999; Long et al., 2000) and in chronic care facilities (Schols & Berendschot-deLange, 1999)
- Implementing a public education strategy designed to enhance knowledge of tissue donation (Siminoff et al., 1995; Heng et al., 2000)
- Implementing well-designed provincial legislation to promote tissue donation (Siminoff et al., 1995; Heng et al., 2000)

This preliminary work suggests that there are more than enough potential donors to meet the tissue needs of Canadians. Given that the estimates computed in this report were based on deaths in acute care hospitals only, which account for roughly half of all deaths in Canada annually, deaths in other facilities could augment further the potential pool of tissue donors. Crude estimates based on data from CIHI's National Ambulatory Care Reporting System and Chronic Care Patient System suggest that between 8,532 to 17,064 potential tissue donors could be expected annually from emergency rooms, and an additional 1,350 to 2,700 potential skin or cornea donors per year may be available from chronic care facilities. Unlike the barriers that exist for vital organs, tissue donation appears not to be curtailed by problems with lack of available donors, but with system/process issues and a lack of infrastructure. If the appropriate infrastructure was in place to identify potential donors, procure, and process tissues, it would appear that demands for tissue could be met by internal supply.

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Appendix A. Types of Allograft Tissue by Procedure and Specialty[8]

Tissue Type	Procedure	Specialty
Bone / Cartilage		
Cancellous bone (ground & chips) Demineralized bone Structural bone Osteochondral, Peri-articular grafts	Revision of total hip arthroplasty Revision of total knee arthroplasty Open wedge osteotomy Fractures upper limb – radius, scaphoid Fractures lower limb – subtrochanteric, peri-prosthetic Limb reconstruction post trauma / post tumour removal Bone void filler Limb & joint sparing Joint resurfacing, articular defects Repair – osteoporotic bone fractures Osteochondral repair / transplant Mosaicplasty Ankle fusion / arthrodesis	Orthopaedic surgery Oncology Trauma surgery Sports medicine
	Anterior cervical discectomy Anterior cervical discectomy & fusion Posterior cervical fusion Cervical spine decompression Thoracic spine reconstruction Lumbar fusion Corpectomy Thoracolumbar vertebrectomies Instrumented lumbosacral fusion Spinal reconstruction Postero lateral interbody fusion Antero lateral interbody fusion Laminectomy Spinal cage with bone filler	Spine surgery: Othopaedic surgery Neurosurgery
	Replacement for bone lost (eg. post trauma, post cancer surgery) Gingioplasty Alveoloplasty Partial ostectomy of facial bone, except mandible Reconstruction of mandible with associated resection Extraction socket preservation Osseous defects for periodontal Sinus lift Grafting associated with dental implants Ridge augmentation	Oral & maxillo-facial surgery Periodontal procedures
Tendons		
Achilles Hamstring Patellar Posterior tibialis Anterior tibialis	Anterior cruciate ligament (ACL) repair Revision of ACL repair Posterior cruciate ligament (PCL) repair Revision of PCL repair Multi ligament repair / reconstruction– knee Single or multi ligament repair / reconstruction– ankle Rotator cuff repair, tissue augmentation	Orthopaedic surgery Sports medicine

[8] Source: Canadian Institute for Health Information. (2003). *Demand of Human Allograft Tissue in Canada: Final Report.* Ottawa: CIHI.

Tissue Type	Procedure	Specialty
Soft Tissue		
Meniscus Fascia	Meniscal transplant Brain tumour removal with fascial transplant Posterior fossa decompression Detethering of cord Craniotomy with fascial transplant Supra-pubic sling surgery Reconstructive surgery	Orthopaedic surgery Neurosurgery Urology Oral & maxillo-facial surgery Periodontal
Cardiovascular		
Cardiac valves Valved & non-valved conduits Pericardium Veins	Ross procedure Norwood procedure Valved conduit for Bentall procedure Aortic valve replacement Pulmonary valve replacement Pulmonary arterioplasty Patch aortoplasty Replacement of ascending aorta & valve Right ventricle to pulmonary artery conduit Aortic root reconstruction Arch reconstruction Transannular patch Vascular bypass	Cardiac surgery – adult & paediatric Vascular surgery
Skin		
Skin	Burns– 3rd degree, deep 3rd degree Problem wounds Fasciitis Ulcers Temporary closures, eg. radiation wounds Toxic epidermal necrolitis Post traumatic wound	Burns specialists Plastic surgery Oral & maxillo-facial surgery Periodontal
Ocular		
Corneas Sclera Amniotic membrane	Penetrating keratoplasty Lamellar keratoplasty Keratolimbal allograft Deep lamellar endothelial keratoplasty Corneal surface repair with graft Epikeratophakia Scleral surgery	Corneal transplant surgery Ophthalmology

Appendix B. Inclusion-Exclusion Criteria
These criteria were based on the CSA Guidelines as well as feedback provided by experts in the field of tissue banking.

OCULAR

Amniotic Membrane*

Inclusions:

Women who have given birth via caesarean section during their acute care hospital admission in a Canadian hospital; discharge status=alive

ICD-9

669.7 **or** 654.2 - Caesarean delivery, without mention of indication **or** Previous C-section

CCP

86.0-86.2 - Caesarean section

Exclusions:

ICD-9

091-097 – Syphillis (RCOL)
042.0-044.9, 795.8 - HIV/HTLV (RCOL)
070.2-070.3 - Viral hepatitis B (RCOL)
070.6-070.9 - Viral hepatitis C (RCOL)

**RCOL=Royal College of Ophthalmologists of London (UK).*

Cornea/Sclera

Inclusions:

Discharge status=dead; acute care hospitalization in Canadian hospital

Age inclusions:

Loose Criteria

18 mos-80 yrs

Mid-Range

2-70 yrs

Strict Criteria

2-60 yrs

Exclusions:

ICD-9

798-799 - Death unknown cause (CSA)
038, 022.3, 659.3, 027.0, 036.2, 003.1, 670 - Active septicaemia (CSA)
042.0-044.9, 795.8 - HIV/HTLV (CSA)
045 - Acute poliomyelitis (CSA)
046.1, 331.5 - Creutzfeldt-Jakob disease (CSA)
046.2, 323.1 - Subacute sclerosing panencephalitis (CSA)
046.3, 331.6 - Progressive multifocal leukoencephalitis (CSA)
049.8, 049.9, 054.3, 062-064, 323.0, 323.2, 323.9 - Active encephalitis (CSA)
054.5 - Herpetic septicaemia (CSA)
056.0, 056.7, 056.8, 056.9 - Congenital rubella (CSA)
070.2, 070.3 - Viral hepatitis B (CSA)
070.6, 070.9 - Viral hepatitis C (CSA)
234.0 - Carcinoma in situ of eye (CSA)
331.8 - Reye's syndrome (CSA)
360-364, 370 - Eye disorders/disease (CSA)
071 – Rabies (CSA)
084 – Malaria (CSA)
091-097 - Active syphilis (CSA)
098 - Active gonorrhea (CSA)
117.9 - Systemic mycosis (CSA - Clinical decision)
200-203 - Active disseminated lymphomas (including Hodgkins, non-Hodgkins, Sezary syndrome) (CSA)

204-208 – Leukemias (CSA)
320-322, 047, 049.0, 049.1 - Meningitis (bacterial/viral) (CSA)
331.0 - Alzheimer's disease (CSA)
332.0 - Parkinson's disease (CSA)
335.2 - Amyotrophic lateral sclerosis (CSA)
340 – Multiple sclerosis (CSA)
421.0, 421.1, 421.9, 391.1 - Active endocarditis (CSA)
710 - Mixed connective tissue disease (CSA)
253.3 - Pituitary dwarfism (possible marker of receipt of human pituitary growth factor) (CSA)
V42.5, V42.8, V42.9 - Previous cornea/other/unspecified transplant (CSA)
V43.0 – Eye globe replaced by other means
V43.1 – Lens replaced by other means
V45.6 - States following surgery of eye or adnexa (CSA)

GENERAL EXCLUSIONS FOR CADAVERIC TISSUE DONORS

Applies to all the cadaveric tissue donors described in this report, except the cornea donors.

ICD-9

798-799 - Death unknown cause (CSA)
010-018 – Tuberculosis (CSA)
038, 022.3, 659.3, 027.0, 036.2, 003.1, 670 - Active septicaemia (CSA)
042.0-044.9, 795.8 - HIV/HTLV (CSA)
045 - Acute poliomyelitis (CSA)
046.1, 331.5 - Creutzfeldt-Jakob disease (CSA)
046.2, 323.1 - Subacute sclerosing panencephalitis (CSA)
046.3, 331.6 - Progressive multifocal leukoencephalitis (CSA)
049.8, 049.9, 054.3, 062-064, 323.0, 323.2, 323.9 - Active encephalitis (CSA)
054.5 - Herpetic septicaemia (CSA)
070.2, 070.3 - Viral hepatitis B (CSA)
070.6, 070.9 - Viral hepatitis C (CSA)
071 – Rabies (CSA)
084 – Malaria (CSA)
091-097 - Active syphilis (CSA)
098 - Active gonorrhea (CSA)
117.9 - Systemic mycosis (CSA - Clinical decision)
140-199 - Malignant neoplasms (CSA)
200-203 - Active disseminated lymphomas (including Hodgkins, non-Hodgkins, Sezary syndrome) (CSA)
204-208 – Leukemias (CSA)
282-285 - Myelodysplastic syndromes including refractory anemia (Advisory)
320-322, 047, 049.0, 049.1 - Meningitis (bacterial/viral) (CSA)
331.0 - Alzheimer's disease (CSA)
332.0 - Parkinson's disease (CSA)
335.2 - Amyotrophic lateral sclerosis (CSA)
340 – Multiple sclerosis (CSA)
421.0, 421.1, 421.9, 391.1 - Active endocarditis (CSA)
710 - Mixed connective tissue disease (CSA)
V58.1 - Chemotherapy for cancer (CSA)
V58.0 – Teleradiotherapy (CSA)
253.3 - Pituitary dwarfism (possible marker of receipt of human pituitary growth factor) (CSA)
V42 - Previous tissue/organ transplant (CSA)

SKIN

Inclusions:

Discharge status=dead; acute care hospitalization in Canadian hospital

Age inclusions:

Loose Criteria
12-85 yrs
Mid-Range
16-65 yrs
Strict Criteria
16-50 yrs

Exclusions:

General exclusions as above, plus:

ICD-9
030 - Leprosy/Hansen's disease (Advisory)
054 - Herpes simplex (Advisory)
103, 110, 111, 686 - Skin infections (Advisory)
694.4, 757.3 – Pemphigus (Advisory)
694.5 - Bullous pemiphigoid (Advisory)
708 or 691.8 with 493 - Urticaria/atopic dermatitis where asthma also occurs (Advisory)
942, 943, 945 - Acute burns (Advisory)

MUSCULOSKELETAL
Bone

Inclusions:

Discharge status=dead; acute care hospitalization in Canadian hospital

Age inclusions:

Loose Criteria
12-85 yrs
Mid-Range
16-65 yrs
Strict Criteria
16-50 yrs

Exclusions:

General exclusions as above, plus:

ICD-9
030 - Leprosy/Hansen's Disease (Advisory)
135 – Scarcoidosis (CSA)
277.3 – Amyloidoisis (Advisory)
446.0 - Polyarteritis nodosa (CSA)
714.0-714.3 - Rheumatoid arthritis (Advisory)
730 – Osteomyelitis (Advisory)
731, 732, 733.0 - Clinically significant metabolic bone disease (CSA)

MUSCULOSKELETAL
Soft/Connective Tissue

Inclusions:
Discharge status=dead; acute care hospitalization in Canadian hospital

Age inclusions:
Loose Criteria
15-60 yrs
Mid-Range
16-50 yrs
Strict Criteria (as per South Dakota Lions Eye Bank)
12-45 yrs

Exclusions for Loose Criteria and Mid-Range:
General exclusions as above plus:
ICD-9
030 - Leprosy/Hansen's Disease (Advisory)
135 – Scarcoidosis (CSA)
277.3 – Amyloidoisis (Advisory)
446.0 - Polyarteritis nodosa (CSA)
694.4, 757.3 – Pemphigus (Advisory)
708 - Bullous pemiphigoid (Advisory)
730 – Osteomyelitis (CSA)

Exclusions for Strict Criteria:
General exclusions, exclusions for loose criteria and mid-range as above, plus:
446.2 - Goodpasture's syndrome (Advisory)
250 - Insulin resistance (code for Diabetes Mellitus) (Advisory)
283.0 - Autoimmune hemolytic anemia (Advisory)
446.6, 287.3 - Autoimmune thrombocytopenic purpura (Advisory)
571.6 - Primary biliary cirrhosis (Advisory)
252-255, 259 - Other endocrine gland failure (Advisory)
447.6 - Vasculitis (disseminated) (Advisory)

CARDIOVASCULAR
Heart Valve

Inclusions:
Discharge status=dead; acute care hospitalization in Canadian hospital

Age inclusions:
Loose Criteria
Newborn-60 yrs
Mid-Range
Newborn-55 yrs
Strict Criteria
Newborn-50 yrs

**Weight is not collected in HMDB so the "Newborn" designation will be used in combination with an exclusion of all conditions affecting newborns (ICD-9 codes 760-779), which includes immaturity/low birth weight.*

Exclusions for Loose Criteria and Mid-Range:
General exclusions as above, plus:
ICD-9
086.0 - Chagas disease (CSA)
245.2 - Hashimoto's thyroiditis (Advisory)
710 - Systemic lupus erythematosus (Advisory)
446.2 - Goodpasture's syndrome (Advisory)
694.4, 757.3 – Pemphigus (Advisory)
242.0 - Graves disease (Advisory)
358.0 - Myasthenia grave (Advisory)
283.0 - Autoimmune hemolytic anemia (Advisory)
446.6 - Autoimmune thrombocytopenic purpura (Advisory)
714.0-714.3 - Rheumatoid arthritis (Advisory)

710 - Mixed connective tissue disease (Advisory)
281.0 - Idiopathic Addison's disease (Advisory)
583.9 – Glomerulonephritis (Advisory)
694.5 - Bullous pemiphigoid (Advisory)
250 - Diabetes mellitus (Advisory)
709.0 – Vitiligo (Advisory)
447.6 - Vasculitis (disseminated) (Advisory)
708 or 691.8 with 493 - Urticaria/atopic dermatitis where asthma also occurs (Advisory)
446.4 - Wegner's granulomatosis (Advisory)
759.8 - Marfan's syndrome (Advisory)
390-398 - Rheumatic fever (CSA)
394, 396, 422, 424.0 - History of mitral valve disease/prolapse (CSA)
424.9 - Semilunar valvular disease (CSA)
398, 425.4, 425.8 - Cardiomyopathy of viral or idiopathic etiology (CSA)

Exclusions for Strict Criteria:
General exclusions, exclusions for loose criteria and mid-range as above, plus:

CCP
13.72 - Cardiac defibrillations (Advisory)
13.73 - Closed chest massage (Advisory)

ICD-9
281.0 - Pernicious anemia (Advisory)
571.6 - Primary biliary cirrhosis (Advisory)
259 - Other endocrine gland failure (Advisory)
429.4 - Post myocardial infarction cardiotomy syndrome (Advisory)

CARDIOVASCULAR
Femoral vein
As per New England Organ Bank

Inclusions:
Discharge status=dead; acute care hospitalization in Canadian hospital

Age/gender inclusions:
Males only; 17-39 yrs

Exclusions:
General exclusions as above, plus:

ICD-9
451-456 - Diseases of veins

Femoral vein
As per South Dakota Lions Eye Bank

Inclusions:
Discharge status=dead; acute care hospitalization in Canadian hospital

Age/gender inclusions:
15-29 yrs for females; 15-49 yrs for males

Exclusions:
General exclusions as above, plus:

ICD-9
451-456 - Diseases of veins

CARDIOVASCULAR
Saphenous vein
As per New England Organ Bank

Inclusions:
Discharge status=dead; acute care hospitalization in Canadian hospital

Age/gender inclusions:
17-49 yrs for females; 17-59 yrs for males

Exclusions:
General exclusions as above, plus:
ICD-9
451-456 - Diseases of veins

Saphenous vein
As per South Dakota Lions Eye Bank

Inclusions:
Discharge status=dead; acute care hospitalization in Canadian hospital

Age/gender inclusions:
15-29 yrs for females; 16-65 yrs for males

Exclusions:
General exclusions as above, plus:
ICD-9
451-456 - Diseases of veins

Appendix C. Ad Hoc Advisory Committee Members

Ad hoc advisors are listed in alphabetical order.

- Ms. Fides Coloma, Tissue Coordinator, Trillium Gift of Life Network
- Ms. Catherine Hackett, Transplantation Services, QEII Health Sciences Centre
- Mr. Kim Liss, CCDT Secretariat
- Mr. Jim Mohr, Chair, CCDT Tissue Subcommittee
- Ms. Nicolle Ouellete, Tissue Services Coordinator, Dr. Donald MacLellan Tissue Bank
- Ms. Christina Rogers, Comprehensive Tissue Centre, University of Alberta Hospital
- Ms. Linda Socha, Tissue Donor Coordinator, Saskatchewan Transplant Program/Lions Eye Bank

Appendix D. All Acute Care Hospital Deaths and Deaths with General Exclusions

		Calendar Year						
		1995	1996	1997	1998	1999	2000	6-year average
CAN								
	Acute care hospital admissions resulting in deaths	107,790	108,201	106,840	109,046	110,134	109,282	108,548.83
	Deaths with diagnoses within General Exclusions	58,930	59,698	58,374	60,853	63,019	63,728	60,767.00
	% of acute care hospital deaths with General Exclusions	54.7	55.2	54.6	55.8	57.2	58.3	56.0
BC								
	Acute care hospital admissions resulting in deaths	14,526	15,128	14,859	15,066	15,607	15,428	15,102.33
	Deaths with diagnoses within General Exclusions	7,738	7,937	8,022	8,083	8,417	8,257	8,075.67
	% of acute care hospital deaths with General Exclusions	53.3	52.5	54.0	53.7	53.9	53.5	53.5
AB								
	Acute care hospital admissions resulting in deaths	7,374	7,625	7,372	7,566	8,258	8,401	7,766.00
	Deaths with diagnoses within General Exclusions	4,773	4,819	4,463	4,622	5,224	5,457	4,893.00
	% of acute care hospital deaths with General Exclusions	64.7	63.2	60.5	61.1	63.3	65.0	63.0
SK								
	Acute care hospital admissions resulting in deaths	4,405	4,392	4,160	4,375	4,217	4,227	4,296.00
	Deaths with diagnoses within General Exclusions	2,130	2,170	2,023	2,346	2,417	2,457	2,257.17
	% of acute care hospital deaths with General Exclusions	48.4	49.4	48.6	53.6	57.3	58.1	52.5
MB								
	Acute care hospital admissions resulting in deaths	5,046	4,989	4,720	4,980	4,931	4,901	4,927.83
	Deaths with diagnoses within General Exclusions	2,608	2,926	2,534	2,652	2,732	2,780	2,705.33
	% of acute care hospital deaths with General Exclusions	51.7	58.6	53.7	53.3	55.4	56.7	54.9

		Calendar Year						
		1995	1996	1997	1998	1999	2000	6-year average
ON								
	Acute care hospital admissions resulting in deaths	39,738	39,392	38,463	39,157	39,554	39,079	39,230.50
	Deaths with diagnoses within General Exclusions	21,266	21,065	20,685	21,635	22,498	22,764	21,652.17
	% of acute care hospital deaths with General Exclusions	53.5	53.5	53.8	55.3	56.9	58.3	55.2
QC								
	Acute care hospital admissions resulting in deaths	27,859	26,721	26,739	27,119	26,998	26,394	26,971.67
	Deaths with diagnoses within General Exclusions	15,856	15,502	15,131	15,760	15,907	16,096	15,708.67
	% of acute care hospital deaths with General Exclusions	56.9	58.0	56.6	58.1	58.9	61.0	58.2
NB								
	Acute care hospital admissions resulting in deaths	3,233	3,258	3,342	3,534	3,543	3,563	3,412.17
	Deaths with diagnoses within General Exclusions	1,666	1,695	1,712	1,866	1,946	2,054	1,823.17
	% of acute care hospital deaths with General Exclusions	51.5	52.0	51.2	52.8	54.9	57.6	53.4
NL								
	Acute care hospital admissions resulting in deaths	2,068	2,040	2,269	2,224	2,178	2,185	2,160.67
	Deaths with diagnoses within General Exclusions	940	956	1,031	1,057	1,036	1,010	1,005.00
	% of acute care hospital deaths with General Exclusions	45.5	46.9	45.4	47.5	47.6	46.2	46.5
NS&PE								
	Acute care hospital admissions resulting in deaths	3,438	4,573	4,822	4,920	4,734	4,979	4,577.67
	Deaths with diagnoses within General Exclusions	1,906	2,581	2,717	2,772	2,775	2,775	2,587.67
	% of acute care hospital deaths with General Exclusions	55.4	56.4	56.3	56.3	58.6	55.7	56.5
Terr.								
	Acute care hospital admissions resulting in deaths	103	83	94	105	114	125	104.00

	Calendar Year						
	1995	1996	1997	1998	1999	2000	6-year average
Deaths with diagnoses within General Exclusions	47	47	56	60	67	78	59.17
% of acute care hospital deaths with General Exclusions	45.6	56.6	59.6	57.1	58.8	62.4	56.9

Appendix E. Background Data on Deaths, Acute Care Hospital Deaths and Acute Care Hospital Admissions

		Calendar Year						
		1995	1996	1997	1998	1999	2000	6-year average
CAN	Total deaths (Statistics Canada)	210,733	212,859	215,669	218,091	219,530	218,039	215,820.17
	Acute care hospital admissions resulting in deaths (HMDB)	107,790	108,201	106,840	109,046	110,134	109,282	108,548.83
	% of acute care hospital deaths per total deaths	51.15	50.83	49.54	50.00	50.17	50.12	50.30
	All acute care hospital admissions	3,550,062	3,386,888	3,271,676	3,222,265	3,184,594	3,118,142	3,288,937.83
	Admissions resulting in deaths	107,790	108,201	106,840	109,046	110,134	109,282	108,548.83
	% of deaths per admissions	3.04	3.19	3.27	3.38	3.46	3.50	3.30
BC	Total deaths* (Statistics Canada)	26,375	27,536	27,412	27,978	28,017	27,460	27,463.00
	Acute care hospital admissions resulting in deaths (HMDB)	14,526	15,128	14,859	15,066	15,607	15,428	15,102.33
	% of acute care hospital deaths per total deaths	55.07	54.94	54.21	53.85	55.71	56.18	54.99
	All acute care hospital admissions	447,530	439,750	435,820	420,461	419,307	405,215	428,013.83
	Admissions resulting in deaths	14,526	15,128	14,859	15,066	15,607	15,428	15,102.33
	% of deaths per admissions	3.25	3.44	3.41	3.58	3.72	3.81	3.53
AB	Total deaths* (Statistics Canada)	15,895	16,391	16,452	16,795	17,206	17,273	16,668.67
	Acute care hospital admissions resulting in deaths (HMDB)	7,374	7,625	7,372	7,566	8,258	8,401	7,766.00
	% of acute care hospital deaths per total deaths	46.39	46.52	44.81	45.05	47.99	48.64	46.59
	All acute care hospital admissions	336,134	325,789	322,473	327,005	331,692	326,605	328,283.00
	Admissions resulting in deaths	7,374	7,625	7,372	7,566	8,258	8,401	7,766.00
	% of deaths per admissions	2.19	2.34	2.29	2.31	2.49	2.57	2.37
SK	Total deaths* (Statistics Canada)	8,495	8,765	8,637	8,905	9,044	8,956	8,800.33
	Acute care hospital admissions resulting in deaths (HMDB)	4,405	4,392	4,160	4,375	4,217	4,227	4,296.00
	% of acute care hospital deaths per total deaths	51.85	50.11	48.16	49.13	46.63	47.20	48.82
	All acute care hospital admissions	168,772	163,735	159,085	154,467	146,347	144,210	156,102.67
	Admissions resulting in deaths	4,405	4,392	4,160	4,375	4,217	4,227	4,296.00
	% of deaths per admissions	2.61	2.68	2.61	2.83	2.88	2.93	2.75
MB	Total deaths* (Statistics Canada)	9,658	9,497	9,511	9,815	9,860	9,892	9,705.50
	Acute care hospital admissions resulting in deaths (HMDB)	5,046	4,989	4,720	4,980	4,931	4,901	4,927.83
	% of acute care hospital deaths per total deaths	52.25	52.53	49.63	50.74	50.01	49.55	50.77
	All acute care hospital admissions	154,124	146,309	142,694	143,526	141,223	136,482	144,059.67
	Admissions resulting in deaths	5,046	4,989	4,720	4,980	4,931	4,901	4,927.83
	% of deaths per admissions	3.27	3.41	3.31	3.47	3.49	3.59	3.42
ON	Total deaths* (Statistics Canada)	78,479	79,099	79,541	80,184	81,397	81,290	79,998.33
	Acute care hospital admissions resulting in deaths (HMDB)	39,738	39,392	38,463	39,157	39,554	39,079	39,230.50
	% of acute care hospital deaths per total deaths	50.64	49.80	48.36	48.83	48.59	48.07	49.04
	All acute care hospital admissions	821,306	769,127	742,472	728,540	714,503	709,516	747,577.33
	Admissions resulting in deaths	27,859	26,721	26,739	27,119	26,998	26,394	26,971.67
	% of deaths per admissions	3.39	3.47	3.60	3.72	3.78	3.72	3.61

		Calendar Year						
		1995	1996	1997	1998	1999	2000	6-year average
QC	Total deaths* (Statistics Canada)	52,734	52,336	54,399	54,181	54,592	53,190	53,572.00
	Acute care hospital admissions resulting in deaths (HMDB)	27,859	26,721	26,739	27,119	26,998	26,394	26,971.67
	% of acute care hospital deaths per total deaths	52.83	51.06	49.15	50.05	49.45	49.62	50.35
	All acute care hospital admissions	821,306	769,127	742,472	728,540	714,503	709,516	747,577.33
	Admissions resulting in deaths	27,859	26,721	26,739	27,119	26,998	26,394	26,971.67
	% of deaths per admissions	3.39	3.47	3.60	3.72	3.78	3.72	3.61
NB	Total deaths* (Statistics Canada)	5,938	5,896	5,944	6,305	6,074	6,088	6,040.83
	Acute care hospital admissions resulting in deaths (HMDB)	3,233	3,258	3,342	3,534	3,543	3,563	3,412.17
	% of acute care hospital deaths per total deaths	54.45	55.26	56.22	56.05	58.33	58.52	56.49
	All acute care hospital admissions	120,582	117,008	115,045	114,006	113,127	108,120	114,648.00
	Admissions resulting in deaths	3,233	3,258	3,342	3,534	3,543	3,563	3,412.17
	% of deaths per admissions	2.68	2.78	2.90	3.10	3.13	3.30	2.98
NL	Total deaths* (Statistics Canada)	3,935	3,928	4,318	4,230	4,139	4,339	4,148.17
	Acute care hospital admissions resulting in deaths (HMDB)	2,068	2,040	2,269	2,224	2,178	2,185	2,160.67
	% of acute care hospital deaths per total deaths	52.6	51.9	52.5	52.6	52.6	50.4	52.09
	All acute care hospital admissions	73,692	71,498	69,688	68,455	65,426	61,595	68,392.33
	Admissions resulting in deaths	2,068	2,040	2,269	2,224	2,178	2,185	2,160.67
	% of deaths per admissions	2.81	2.85	3.26	3.25	3.33	3.55	3.16
NS&PE	Total deaths* (Statistics Canada)	8,840	9,019	9,074	9,275	8,777	9,108	9,015.50
	Acute care hospital admissions resulting in deaths (HMDB)	3,438	4,573	4,822	4,920	4,734	4,979	4,577.67
	% of acute care hospital deaths per total deaths	38.9	50.7	53.1	53.0	53.9	54.7	50.78
	All acute care hospital admissions	144,144	136,384	130,955	130,193	127,682	122,099	131,909.50
	Admissions resulting in deaths	3,438	4,573	4,822	4,920	4,734	4,979	4,577.67
	% of deaths per admissions	2.39	3.35	3.68	3.78	3.71	4.08	3.47
Terr.	Total deaths* (Statistics Canada)	384	392	381	423	424	443	407.83
	Acute care hospital admissions resulting in deaths (HMDB)	103	83	94	105	114	125	104.00
	% of acute care hospital deaths per total deaths	26.8	21.2	24.7	24.8	26.9	28.2	25.50
	All acute care hospital admissions	11,930	12,169	11,567	11,503	11,212	10,520	11,483.50
	Admissions resulting in deaths	103	83	94	105	114	125	104.00
	% of deaths per admissions	0.86	0.68	0.81	0.91	1.02	1.19	0.91

*Based on place of residence. Most people die in the province in which they reside.

Sources: Statistics Canada Mortality Data & CIHI's Hospital Morbidity Database (HMDB)

Appendix F. Provincial Summaries of Estimates of Tissue Donors

AMNIOTIC MEMBRANE
Provincial data are suppressed due to small cell sizes for excluded cases.

		Calendar Year					
		1995	1996	1997	1998	1999	2000
CAN	Acute care hospital admissions for caesarean procedures (1)	66,083	65,685	63,955	64,144	65,450	67,184
	(1) Exclusions	41	44	37	75	119	90
	39% elective rate	25,756	25,600	24,928	24,987	25,479	26,166
	Caesareans without mention of indication/repeat caesareans (2)	23,879	23,112	22,563	22,293	22,437	23,002
	(2) Exclusions	20	28	19	31	35	36
	Estimated electives	23,859	23,084	22,544	22,262	22,402	22,965

ESTIMATED POTENTIAL EYE DONORS

		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC	Deaths 18 mos - 80 yrs	9,834	10,081	9,740	9,754	9,984	9,712
	Exclusions	5,804	5,924	5,850	5,867	6,002	5,853
	LOOSE CRITERIA: Potential eye donors	4,030	4,157	3,890	3,887	3,982	3,859
	Deaths 2-70 yrs	5,276	5,294	5,102	5,085	5,117	4,910
	Exclusions	3,315	3,291	3,220	3,288	3,288	3,118
	MID-RANGE CRITERIA: Potential eye donors	1,961	2,003	1,882	1,797	1,829	1,792
	Deaths 2-60 yrs	2,554	2,620	2,559	2,506	2,460	2,462
	Exclusions	1,606	1,638	1,581	1,596	1,556	1,522
	STRICT CRITERIA: Potential eye donors	948	982	978	910	904	940
AB	Deaths 18 mos - 80 yrs	4,937	5,094	4,826	4,944	5,286	5,487
	Exclusions	3,555	3,596	3,272	3,391	3,704	3,945
	LOOSE CRITERIA: Potential eye donors	1,382	1,498	1,554	1,553	1,582	1,542
	Deaths 2-70 yrs	2,643	2,862	2,661	2,636	2,867	2,937
	Exclusions	2,022	2,119	1,907	1,914	2,091	2,197
	MID-RANGE CRITERIA: Potential eye donors	621	743	754	722	776	740
	Deaths 2-60 yrs	1,317	1,404	1,315	1,360	1,430	1,468
	Exclusions	1,013	1,061	945	977	1,042	1,106
	STRICT CRITERIA: Potential eye donors	304	343	370	383	388	362

ESTIMATED POTENTIAL EYE DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
SK	Deaths 18 mos - 80 yrs	2,755	2,696	2,507	2,668	2,534	2,545
	Exclusions	1,524	1,552	1,407	1,629	1,646	1,659
	LOOSE CRITERIA: Potential eye donors	1,231	1,144	1,100	1,039	888	886
	Deaths 2-70 yrs	1,356	1,286	1,189	1,278	1,213	1,179
	Exclusions	815	804	732	833	840	816
	MID-RANGE CRITERIA: Potential eye donors	541	482	457	445	373	363
	Deaths 2-60 yrs	582	559	508	579	567	579
	Exclusions	341	355	311	368	386	411
	STRICT CRITERIA: Potential eye donors	241	204	197	211	181	168
MB	Deaths 18 mos - 80 yrs	3,107	3,070	2,805	2,945	2,934	2,889
	Exclusions	1,874	1,912	1,716	1,810	1,861	1,910
	LOOSE CRITERIA: Potential eye donors	1,233	1,158	1,089	1,135	1,073	979
	Deaths 2-70 yrs	1,547	1,526	1,336	1,405	1,365	1,491
	Exclusions	1,023	1,029	905	964	951	1,045
	MID-RANGE CRITERIA: Potential eye donors	524	497	431	441	414	446
	Deaths 2-60 yrs	694	696	625	642	614	694
	Exclusions	476	492	444	450	437	492
	STRICT CRITERIA: Potential eye donors	218	204	181	192	177	202
ON	Deaths 18 mos - 80 yrs	26,118	25,629	24,942	25,160	25,418	24,781
	Exclusions	15,926	15,715	15,314	15,735	16,330	16,276
	LOOSE CRITERIA: Potential eye donors	10,192	9,914	9,628	9,425	9,088	8,505
	Deaths 2-70 yrs	13,738	13,203	12,721	12,627	12,531	12,231
	Exclusions	9,202	8,854	8,521	8,565	8,651	8,666
	MID-RANGE CRITERIA: Potential eye donors	4,536	4,349	4,200	4,062	3,880	3,565
	Deaths 2-60 yrs	6,053	5,798	5,614	5,639	5,653	5,657
	Exclusions	4,266	4,049	3,823	3,909	4,019	4,069
	STRICT CRITERIA: Potential eye donors	1,787	1,749	1,791	1,730	1,634	1,588

ESTIMATED POTENTIAL EYE DONORS							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
QC	Deaths 18 mos - 80 yrs	19,555	18,668	18,326	18,472	18,293	17,839
	Exclusions	12,413	12,020	11,564	11,950	11,974	11,989
	LOOSE CRITERIA: Potential eye donors	7,142	6,648	6,762	6,522	6,319	5,850
	Deaths 2-70 yrs	10,767	10,234	9,845	9,783	9,654	9,313
	Exclusions	7,330	7,118	6,711	6,793	6,698	6,659
	MID-RANGE CRITERIA: Potential eye donors	3,437	3,116	3,134	2,990	2,956	2,654
	Deaths 2-60 yrs	4,771	4,617	4,440	4,365	4,456	4,327
	Exclusions	3,376	3,324	3,156	3,156	3,168	3,132
	STRICT CRITERIA: Potential eye donors	1,395	1,293	1,284	1,209	1,288	1,195
NB	Deaths 18 mos - 80 yrs	2,168	2,173	2,138	2,179	2,226	2,218
	Exclusions	1,257	1,286	1,286	1,335	1,400	1,476
	LOOSE CRITERIA: Potential eye donors	911	887	852	844	826	742
	Deaths 2-70 yrs	1,066	1,067	1,072	1,089	1,123	1,081
	Exclusions	690	700	714	728	759	784
	MID-RANGE CRITERIA: Potential eye donors	376	367	358	361	364	297
	Deaths 2-60 yrs	480	449	457	484	499	481
	Exclusions	326	300	318	344	357	365
	STRICT CRITERIA: Potential eye donors	154	149	139	140	142	116
NL	Deaths 18 mos - 80 yrs	1,447	1,423	1,588	1,517	1,500	1,507
	Exclusions	740	761	827	824	820	808
	LOOSE CRITERIA: Potential eye donors	707	662	761	693	680	699
	Deaths 2-70 yrs	729	765	813	790	735	783
	Exclusions	409	475	468	484	459	478
	MID-RANGE CRITERIA: Potential eye donors	320	290	345	306	276	305
	Deaths 2-60 yrs	340	359	363	356	349	358
	Exclusions	210	235	222	232	226	231
	STRICT CRITERIA: Potential eye donors	130	124	141	124	123	127

ESTIMATED POTENTIAL EYE DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
NS & PE	Deaths 18 mos - 80 yrs	2,238	2,914	3,019	3,060	2,986	3,066
	Exclusions	1,438	1,867	1,943	1,966	1,999	1,945
	LOOSE CRITERIA: Potential eye donors	800	1,047	1,076	1,094	987	1,121
	Deaths 2-70 yrs	1,147	1,479	1,462	1,559	1,528	1,507
	Exclusions	795	1,023	1,035	1,066	1,106	1,049
	MID-RANGE CRITERIA: Potential eye donors	352	456	427	493	422	458
	Deaths 2-60 yrs	501	635	684	700	678	698
	Exclusions	348	461	503	493	496	512
	STRICT CRITERIA: Potential eye donors	153	174	181	207	182	186

ESTIMATED POTENTIAL SKIN DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC	Deaths 12-85 yrs	12,057	12,463	12,190	12,256	12,580	12,249
	Exclusions	6,814	6,968	7,005	7,010	7,176	7,052
	LOOSE CRITERIA: Potential skin donors	5,243	5,495	5,185	5,246	5,404	5,197
	Deaths 16-65 yrs	3,590	3,617	3,489	3,416	3,418	3,381
	Exclusions	2,304	2,303	2,216	2,227	2,208	2,173
	MID-RANGE CRITERIA: Potential skin donors	1,286	1,314	1,273	1,189	1,210	1,208
	Deaths 16-50 yrs	1,295	1,301	1,246	1,197	1,171	1,106
	Exclusions	779	794	723	726	706	625
	STRICT CRITERIA: Potential skin donors	516	507	523	471	465	481
AB	Deaths 12-85 yrs	6,006	6,170	5,896	6,061	6,545	6,679
	Exclusions	4,138	4,157	3,831	3,947	4,407	4,625
	LOOSE CRITERIA: Potential skin donors	1,868	2,013	2,065	2,114	2,138	2,054
	Deaths 16-65 yrs	1,786	1,963	1,813	1,834	1,966	2,002
	Exclusions	1,378	1,472	1,314	1,354	1,454	1,515
	MID-RANGE CRITERIA: Potential skin donors	408	491	499	480	512	487
	Deaths 16-50 yrs	623	680	616	690	682	657
	Exclusions	471	495	418	488	485	472
	STRICT CRITERIA: Potential skin donors	152	185	198	202	197	185
SK	Deaths 12-85 yrs	3,473	3,423	3,234	3,436	3,278	3,228
	Exclusions	1,851	1,875	1,745	2,007	2,034	2,036

ESTIMATED POTENTIAL SKIN DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
MB	LOOSE CRITERIA: Potential skin donors	1,622	1,548	1,489	1,429	1,244	1,192
	Deaths 16-65 yrs	857	828	763	841	810	805
	Exclusions	531	538	490	557	562	572
	MID-RANGE CRITERIA: Potential skin donors	326	290	273	284	248	233
	Deaths 16-50 yrs	259	253	237	253	261	265
	Exclusions	136	150	140	150	169	183
	STRICT CRITERIA: Potential skin donors	123	103	97	103	92	82
	Deaths 12-85 yrs	3,972	3,949	3,680	3,868	3,822	3,714
	Exclusions	2,222	2,294	2,141	2,232	2,317	2,296
ON	LOOSE CRITERIA: Potential skin donors	1,750	1,655	1,539	1,636	1,505	1,418
	Deaths 16-65 yrs	992	1,000	881	940	885	1,009
	Exclusions	681	698	607	648	635	727
	MID-RANGE CRITERIA: Potential skin donors	311	302	274	292	250	282
	Deaths 16-50 yrs	333	303	276	271	265	294
	Exclusions	226	218	184	183	183	196
	STRICT CRITERIA: Potential skin donors	107	85	92	88	82	98
	Deaths 12-85 yrs	32,214	31,863	30,935	31,367	31,521	30,839
	Exclusions	18,670	18,439	18,034	18,629	19,256	19,348
QC	LOOSE CRITERIA: Potential skin donors	13,544	13,424	12,901	12,738	12,265	11,491
	Deaths 16-65 yrs	9,029	8,542	8,184	8,193	8,179	8,126
	Exclusions	6,271	5,912	5,620	5,668	5,767	5,861
	MID-RANGE CRITERIA: Potential skin donors	2,758	2,630	2,564	2,525	2,412	2,265
	Deaths 16-50 yrs	2,718	2,575	2,492	2,479	2,396	2,412
	Exclusions	1,923	1,807	1,641	1,667	1,701	1,698
	STRICT CRITERIA: Potential skin donors	795	768	851	812	695	714
	Deaths 12-85 yrs	23,501	22,509	22,283	22,501	22,357	21,661
	Exclusions	14,054	13,709	13,325	13,779	13,842	13,928
	LOOSE CRITERIA: Potential skin donors	9,447	8,800	8,958	8,722	8,515	7,733
	Deaths 16-65 yrs	7,093	6,755	6,427	6,372	6,412	6,302
	Exclusions	4,935	4,827	4,520	4,572	4,525	4,553
	MID-RANGE CRITERIA: Potential skin donors	2,158	1,928	1,907	1,800	1,887	1,749
	Deaths 16-50 yrs	2,140	2,081	1,811	1,827	1,900	1,719

ESTIMATED POTENTIAL SKIN DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
	Exclusions	1,510	1,469	1,229	1,304	1,296	1,192
	STRICT CRITERIA: Potential skin donors	630	612	582	523	604	527
NB	Deaths 12-85 yrs	2,695	2,702	2,688	2,780	2,852	2,812
	Exclusions	1,472	1,501	1,530	1,610	1,695	1,753
	LOOSE CRITERIA: Potential skin donors	1,223	1,201	1,158	1,170	1,157	1,059
	Deaths 16-65 yrs	719	695	712	686	723	695
	Exclusions	486	477	501	488	511	517
	MID-RANGE CRITERIA: Potential skin donors	233	218	211	198	212	178
	Deaths 16-50 yrs	214	180	209	205	212	183
	Exclusions	130	122	136	132	143	129
	STRICT CRITERIA: Potential skin donors	84	58	73	73	69	54
NL	Deaths 12-85 yrs	1,751	1,762	1,935	1,873	1,833	1,857
	Exclusions	857	878	932	949	937	924
	LOOSE CRITERIA: Potential skin donors	894	884	1,003	924	896	933
	Deaths 16-65 yrs	494	507	528	524	495	496
	Exclusions	287	310	315	338	311	315
	MID-RANGE CRITERIA: Potential skin donors	207	197	213	186	184	181
	Deaths 16-50 yrs	161	167	151	162	137	154
	Exclusions	108	109	86	103	81	97
	STRICT CRITERIA: Potential skin donors	53	58	65	59	56	57
NS & PE	Deaths 12-85 yrs	2,803	3,666	3,877	3,885	3,732	3,939
	Exclusions	1,689	2,228	2,349	2,355	2,391	2,370
	LOOSE CRITERIA: Potential skin donors	1,114	1,438	1,528	1,530	1,341	1,569
	Deaths 16-65 yrs	767	965	966	1,001	995	1,006
	Exclusions	530	696	700	705	740	718
	MID-RANGE CRITERIA: Potential skin donors	237	269	266	296	255	288
	Deaths 16-50 yrs	204	272	269	263	290	290
	Exclusions	129	202	181	184	197	213
	STRICT CRITERIA: Potential skin donors	75	70	88	79	93	77

ESTIMATED POTENTIAL BONE DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC	Deaths 12-85 yrs	12,057	12,463	12,190	12,256	12,580	12,249
	Exclusions	6,910	7,068	7,107	7,115	7,295	7,163
	LOOSE CRITERIA: Potential bone donors	5,147	5,395	5,083	5,141	5,285	5,086
	Deaths 16-65 yrs	3,590	3,617	3,489	3,416	3,418	3,381
	Exclusions	2,317	2,315	2,225	2,243	2,232	2,178
	MID-RANGE CRITERIA: Potential bone donors	1,273	1,302	1,264	1,173	1,186	1,203
	Deaths 16-50 yrs	1,295	1,301	1,246	1,197	1,171	1,106
	Exclusions	779	797	718	727	710	622
	STRICT CRITERIA: Potential bone donors	516	504	528	470	461	484
AB	Deaths 12-85 yrs	6,006	6,170	5,896	6,061	6,545	6,679
	Exclusions	4,205	4,240	3,925	4,032	4,515	4,741
	LOOSE CRITERIA: Potential bone donors	1,801	1,930	1,971	2,029	2,030	1,938
	Deaths 16-65 yrs	1,786	1,963	1,813	1,834	1,966	2,002
	Exclusions	1,384	1,484	1,322	1,362	1,462	1,528
	MID-RANGE CRITERIA: Potential bone donors	402	479	491	472	504	474
	Deaths 16-50 yrs	623	680	616	690	682	657
	Exclusions	471	497	418	490	484	470
	STRICT CRITERIA: Potential bone donors	152	183	198	200	198	187
SK	Deaths 12-85 yrs	3,473	3,423	3,234	3,436	3,278	3,228
	Exclusions	1,876	1,890	1,765	2,030	2,063	2,072
	LOOSE CRITERIA: Potential bone donors	1,597	1,533	1,469	1,406	1,215	1,156
	Deaths 16-65 yrs	857	828	763	841	810	805
	Exclusions	532	538	493	560	565	573
	MID-RANGE CRITERIA: Potential bone donors	325	290	270	281	245	232
	Deaths 16-50 yrs	259	253	237	253	261	265
	Exclusions	136	150	141	150	169	183
	STRICT CRITERIA: Potential bone donors	123	103	96	103	92	82
MB	Deaths 12-85 yrs	3,972	3,949	3,680	3,868	3,822	3,714
	Exclusions	2,259	2,333	2,186	2,281	2,369	2,332
	LOOSE CRITERIA: Potential bone donors	1,713	1,616	1,494	1,587	1,453	1,382
	Deaths 16-65 yrs	992	1,000	881	940	885	1,009
	Exclusions	686	705	613	652	639	732

ESTIMATED POTENTIAL BONE DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
ON	MID-RANGE CRITERIA: Potential bone donors	306	295	268	288	246	277
	Deaths 16-50 yrs	333	303	276	271	265	294
	Exclusions	229	217	187	183	183	197
	STRICT CRITERIA: Potential bone donors	104	86	89	88	82	97
	Deaths 12-85 yrs	32,214	31,863	30,935	31,367	31,521	30,839
	Exclusions	18,924	18,719	18,307	18,895	19,563	19,663
	LOOSE CRITERIA: Potential bone donors	13,290	13,144	12,628	12,472	11,958	11,176
	Deaths 16-65 yrs	9,029	8,542	8,184	8,193	8,179	8,126
	Exclusions	6,305	5,945	5,639	5,686	5,789	5,893
QC	MID-RANGE CRITERIA: Potential bone donors	2,724	2,597	2,545	2,507	2,390	2,233
	Deaths 16-50 yrs	2,718	2,575	2,492	2,479	2,396	2,412
	Exclusions	1,924	1,814	1,637	1,662	1,695	1,693
	STRICT CRITERIA: Potential bone donors	794	761	855	817	701	719
	Deaths 12-85 yrs	23,501	22,509	22,283	22,501	22,357	21,661
	Exclusions	14,354	14,009	13,644	14,098	14,177	14,301
	LOOSE CRITERIA: Potential bone donors	9,147	8,500	8,639	8,403	8,180	7,360
	Deaths 16-65 yrs	7,093	6,755	6,427	6,372	6,412	6,302
	Exclusions	4,977	4,878	4,542	4,597	4,559	4,592
NB	MID-RANGE CRITERIA: Potential bone donors	2,116	1,877	1,885	1,775	1,853	1,710
	Deaths 16-50 yrs	2,140	2,081	1,811	1,827	1,900	1,719
	Exclusions	1,518	1,478	1,227	1,299	1,295	1,189
	STRICT CRITERIA: Potential bone donors	622	603	584	528	605	530
	Deaths 12-85 yrs	2,695	2,702	2,688	2,780	2,852	2,812
	Exclusions	1,492	1,541	1,556	1,628	1,727	1,782
	LOOSE CRITERIA: Potential bone donors	1,203	1,161	1,132	1,152	1,125	1,030
	Deaths 16-65 yrs	719	695	712	686	723	695
	Exclusions	489	482	501	490	517	519
	MID-RANGE CRITERIA: Potential bone donors	230	213	211	196	206	176
	Deaths 16-50 yrs	214	180	209	205	212	183
	Exclusions	131	124	136	133	143	129
	STRICT CRITERIA: Potential bone donors	83	56	73	72	69	54

ESTIMATED POTENTIAL BONE DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
NL	Deaths 12-85 yrs	1,751	1,762	1,935	1,873	1,833	1,857
	Exclusions	865	888	943	955	953	939
	LOOSE CRITERIA: Potential bone donors	886	874	992	918	880	918
	Deaths 16-65 yrs	494	507	528	524	495	496
	Exclusions	286	314	316	338	316	318
	MID-RANGE CRITERIA: Potential bone donors	208	193	212	186	179	178
	Deaths 16-50 yrs	161	167	151	162	137	154
	Exclusions	106	112	87	103	82	98
	STRICT CRITERIA: Potential bone donors	55	55	64	59	55	56
NS & PE	Deaths 12-85 yrs	2,803	3,666	3,877	3,885	3,732	3,939
	Exclusions	1,707	2,271	2,382	2,383	2,418	2,416
	LOOSE CRITERIA: Potential bone donors	1,096	1,395	1,495	1,502	1,314	1,523
	Deaths 16-65 yrs	767	965	966	1,001	995	1,006
	Exclusions	532	704	710	705	740	726
	MID-RANGE CRITERIA: Potential bone donors	235	261	256	296	255	280
	Deaths 16-50 yrs	204	272	269	263	290	290
	Exclusions	127	203	182	184	197	212
	STRICT CRITERIA: Potential bone donors	77	69	87	79	93	78

ESTIMATED POTENTIAL SOFT/CONNECTIVE TISSUE DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC	Deaths 15-60 yrs	2,500	2,561	2,494	2,453	2,415	2,427
	Exclusions	1,594	1,623	1,563	1,592	1,548	1,516
	LOOSE CRITERIA: Potential eye donors	906	938	931	861	867	911
	Deaths 16-50 yrs	1,295	1,301	1,246	1,197	1,171	1,106
	Exclusions	781	798	718	730	712	626
	MID-RANGE CRITERIA: Potential eye donors	514	503	528	467	459	480
	Deaths 12-45 yrs	926	897	873	818	782	757
	Exclusions	536	547	507	476	452	418
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	390	350	366	342	330	339

ESTIMATED POTENTIAL SOFT/CONNECTIVE TISSUE DONORS							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
AB	Deaths 15-60 yrs	1,275	1,373	1,268	1,329	1,390	1,422
	Exclusions	973	1,034	915	967	1,017	1,075
	LOOSE CRITERIA: Potential eye donors	302	339	353	362	373	347
	Deaths 16-50 yrs	623	680	616	690	682	657
	Exclusions	472	497	420	488	481	468
	MID-RANGE CRITERIA: Potential eye donors	151	183	196	202	201	189
	Deaths 12-45 yrs	422	477	442	480	492	435
	Exclusions	334	358	292	334	344	313
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	88	119	150	146	148	122
SK	Deaths 15-60 yrs	557	537	487	560	557	567
	Exclusions	340	352	305	361	383	404
	LOOSE CRITERIA: Potential eye donors	217	185	182	199	174	163
	Deaths 16-50 yrs	259	253	237	253	261	265
	Exclusions	138	151	140	150	169	183
	MID-RANGE CRITERIA: Potential eye donors	121	102	97	103	92	82
	Deaths 12-45 yrs	181	176	160	173	179	169
	Exclusions	100	98	90	103	117	120
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	81	78	70	70	62	49
MB	Deaths 15-60 yrs	676	681	605	624	601	676
	Exclusions	467	483	430	439	426	489
	LOOSE CRITERIA: Potential eye donors	209	198	175	185	175	187
	Deaths 16-50 yrs	333	303	276	271	265	294
	Exclusions	229	219	185	183	183	197
	MID-RANGE CRITERIA: Potential eye donors	104	84	91	88	82	97
	Deaths 12-45 yrs	228	214	178	160	170	184
	Exclusions	155	158	126	115	118	122
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	73	56	52	45	52	62
ON	Deaths 15-60 yrs	5,915	5,664	5,475	5,513	5,539	5,535
	Exclusions	4,210	3,990	3,766	3,845	3,943	4,006

ESTIMATED POTENTIAL SOFT/CONNECTIVE TISSUE DONORS							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
QC	LOOSE CRITERIA: Potential eye donors	1,705	1,674	1,709	1,668	1,596	1,529
	Deaths 16-50 yrs	2,718	2,575	2,492	2,479	2,396	2,412
	Exclusions	1,932	1,815	1,648	1,671	1,697	1,700
	MID-RANGE CRITERIA: Potential eye donors	786	760	844	808	699	712
	Deaths 12-45 yrs	1,811	1,745	1,607	1,603	1,561	1,573
	Exclusions	1,324	1,231	1,084	1,109	1,130	1,128
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	487	514	523	494	431	445
NB	Deaths 15-60 yrs	4,662	4,521	4,343	4,282	4,377	4,258
	Exclusions	3,311	3,274	3,117	3,110	3,105	3,091
	LOOSE CRITERIA: Potential eye donors	1,351	1,247	1,226	1,172	1,272	1,167
	Deaths 16-50 yrs	2,140	2,081	1,811	1,827	1,900	1,719
	Exclusions	1,520	1,480	1,235	1,298	1,292	1,191
	MID-RANGE CRITERIA: Potential eye donors	620	601	576	529	608	528
	Deaths 12-45 yrs	1,423	1,355	1,158	1,114	1,210	1,072
	Exclusions	1,034	974	812	776	823	766
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	389	381	346	338	387	306
NL	Deaths 15-60 yrs	473	445	447	478	492	476
	Exclusions	319	300	315	341	353	361
	LOOSE CRITERIA: Potential eye donors	154	145	132	137	139	115
	Deaths 16-50 yrs	214	180	209	205	212	183
	Exclusions	130	124	136	133	143	129
	MID-RANGE CRITERIA: Potential eye donors	84	56	73	72	69	54
	Deaths 12-45 yrs	148	115	130	128	133	102
	Exclusions	89	81	88	83	88	73
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	59	34	42	45	45	29
	Deaths 15-60 yrs	330	352	348	350	340	347
	Exclusions	203	227	211	230	220	230
	LOOSE CRITERIA: Potential eye donors	127	125	137	120	120	117

ESTIMATED POTENTIAL SOFT/CONNECTIVE TISSUE DONORS							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
	Deaths 16-50 yrs	161	167	151	162	137	154
	Exclusions	106	112	87	103	82	97
	MID-RANGE CRITERIA: Potential eye donors	55	55	64	59	55	57
	Deaths 12-45 yrs	105	96	102	98	87	96
	Exclusions	75	64	59	69	53	59
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	30	32	43	29	34	37
NS & PE	Deaths 15-60 yrs	487	617	666	676	665	683
	Exclusions	336	454	495	481	495	504
	LOOSE CRITERIA: Potential eye donors	151	163	171	195	170	179
	Deaths 16-50 yrs	204	272	269	263	290	290
	Exclusions	127	202	183	185	197	212
	MID-RANGE CRITERIA: Potential eye donors	77	70	86	78	93	78
	Deaths 12-45 yrs	136	183	162	165	180	189
	Exclusions	86	136	110	117	128	137
	SOUTH DAKOTA LIONS EYE BANK CRITERIA: Potential eye donors	50	47	52	48	52	52

ESTIMATED POTENTIAL HEART VALVE DONORS							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC	Deaths Newborn-60 yrs	2,793	2,835	2,741	2,673	2,622	2,611
	Exclusions	1,921	1,925	1,857	1,864	1,823	1,764
	LOOSE CRITERIA: Potential heart valve donors	872	910	884	809	799	847
	Deaths Newborn-55 yrs	2,066	2,104	2,038	1,965	1,923	1,867
	Exclusions	1,383	1,415	1,334	1,328	1,314	1,214
	MID-RANGE CRITERIA: Potential heart valve donors	683	689	704	637	609	653
	Deaths Newborn-50 yrs	1,595	1,581	1,495	1,424	1,386	1,299
	Exclusions	1,130	1,121	1,025	996	964	859

ESTIMATED POTENTIAL HEART VALVE DONORS							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
	STRICT CRITERIA: Potential heart valve donors	465	460	470	428	422	440
AB							
	Deaths Newborn-60 yrs	1,537	1,583	1,481	1,539	1,621	1,667
	Exclusions	1,248	1,268	1,135	1,189	1,256	1,331
	LOOSE CRITERIA: Potential heart valve donors	289	315	346	350	365	336
	Deaths Newborn-55 yrs	1,158	1,169	1,102	1,188	1,232	1,233
	Exclusions	945	917	837	906	941	960
	MID-RANGE CRITERIA: Potential heart valve donors	213	252	265	282	291	273
	Deaths Newborn-50 yrs	888	893	835	910	919	907
	Exclusions	742	722	634	705	699	698
	STRICT CRITERIA: Potential heart valve donors	146	171	201	205	220	209
SK							
	Deaths Newborn-60 yrs	683	648	589	648	626	629
	Exclusions	448	449	390	463	467	484
	LOOSE CRITERIA: Potential heart valve donors	235	199	199	185	159	145
	Deaths Newborn-55 yrs	524	478	431	461	446	448
	Exclusions	338	317	276	314	323	339
	MID-RANGE CRITERIA: Potential heart valve donors	186	161	155	147	123	109
	Deaths Newborn-50 yrs	387	366	343	341	330	330
	Exclusions	254	249	222	233	244	255
	STRICT CRITERIA: Potential heart valve donors	133	117	121	108	86	75
MB							
	Deaths Newborn-60 yrs	777	782	695	711	695	749
	Exclusions	604	607	550	548	549	589
	LOOSE CRITERIA: Potential heart valve donors	173	175	145	163	146	160
	Deaths Newborn-55 yrs	574	567	510	487	507	533
	Exclusions	447	440	397	369	389	402

ESTIMATED POTENTIAL HEART VALVE DONORS							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
	MID-RANGE CRITERIA: Potential heart valve donors	127	127	113	118	118	131
	Deaths Newborn-50 yrs	437	406	367	359	359	369
	Exclusions	335	315	279	267	278	275
	STRICT CRITERIA: Potential heart valve donors	102	91	88	92	81	94
ON							
	Deaths Newborn-60 yrs	6,799	6,534	6,259	6,216	6,287	6,282
	Exclusions	5,240	5,032	4,716	4,743	4,913	4,949
	LOOSE CRITERIA: Potential heart valve donors	1,559	1,502	1,543	1,473	1,374	1,333
	Deaths Newborn-55 yrs	4,935	4,697	4,493	4,447	4,438	4,511
	Exclusions	3,785	3,615	3,327	3,320	3,453	3,512
	MID-RANGE CRITERIA: Potential heart valve donors	1,150	1,082	1,166	1,127	985	999
	Deaths Newborn-50 yrs	3,617	3,458	3,286	3,198	3,156	3,172
	Exclusions	2,787	2,667	2,420	2,379	2,444	2,450
	STRICT CRITERIA: Potential heart valve donors	830	791	866	819	712	722
QC							
	Deaths Newborn-60 yrs	5,187	4,965	4,832	4,743	4,777	4,617
	Exclusions	3,957	3,838	3,736	3,704	3,647	3,643
	LOOSE CRITERIA: Potential heart valve donors	1,230	1,127	1,096	1,039	1,130	974
	Deaths Newborn-55 yrs	3,720	3,565	3,367	3,323	3,320	3,121
	Exclusions	2,807	2,716	2,527	2,571	2,494	2,415
	MID-RANGE CRITERIA: Potential heart valve donors	913	849	840	752	826	706
	Deaths Newborn-50 yrs	2,678	2,537	2,310	2,294	2,308	2,083
	Exclusions	2,049	1,914	1,723	1,780	1,726	1,606
	STRICT CRITERIA: Potential heart valve donors	629	623	587	514	582	477
NB							
	Deaths Newborn-60 yrs	504	474	483	522	526	501
	Exclusions	361	349	366	400	408	413

ESTIMATED POTENTIAL HEART VALVE DONORS		Calendar Year					
		1995	1996	1997	1998	1999	2000
	LOOSE CRITERIA: Potential heart valve donors	143	125	117	122	118	88
	Deaths Newborn-55 yrs	336	314	345	367	369	341
	Exclusions	231	233	248	272	277	271
	MID-RANGE CRITERIA: Potential heart valve donors	105	81	97	95	92	70
	Deaths Newborn-50 yrs	246	211	246	253	247	210
	Exclusions	162	157	180	181	190	165
	STRICT CRITERIA: Potential heart valve donors	84	54	66	72	57	45
NL							
	Deaths Newborn-60 yrs	375	395	386	375	373	375
	Exclusions	258	291	261	267	250	258
	LOOSE CRITERIA: Potential heart valve donors	117	104	125	108	123	117
	Deaths Newborn-55 yrs	277	294	278	271	261	274
	Exclusions	195	218	185	192	179	185
	MID-RANGE CRITERIA: Potential heart valve donors	82	76	93	79	82	89
	Deaths Newborn-50 yrs	206	210	189	188	172	182
	Exclusions	152	157	121	133	109	115
	STRICT CRITERIA: Potential heart valve donors	54	53	68	55	63	67
NS & PE							
	Deaths Newborn-60 yrs	550	702	744	764	720	740
	Exclusions	403	561	584	584	562	570
	LOOSE CRITERIA: Potential heart valve donors	147	141	160	180	158	170
	Deaths Newborn-55 yrs	386	506	520	517	507	532
	Exclusions	277	401	393	391	379	404
	MID-RANGE CRITERIA: Potential heart valve donors	109	105	127	126	128	128
	Deaths Newborn-50 yrs	267	360	348	352	346	349
	Exclusions	183	282	251	270	256	262

ESTIMATED POTENTIAL HEART VALVE DONORS						
	Calendar Year					
	1995	1996	1997	1998	1999	2000
STRICT CRITERIA: Potential heart valve donors	84	78	97	82	90	87

POTENTIAL FEMORAL VEIN DONOR ESTIMATE BASED ON NEW ENGLAND ORGAN BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC							
	Deaths - Males 17-39 yrs	377	370	324	287	253	254
	Exclusions	191	181	141	121	120	110
	Potential femoral vein donors	186	189	183	166	133	144
AB							
	Deaths - Males 17-39 yrs	151	155	127	156	141	137
	Exclusions	102	109	71	84	82	75
	Potential femoral vein donors	49	46	56	72	59	62
SK							
	Deaths - Males 17-39 yrs	62	59	39	59	53	44
	Exclusions	23	30	14	30	18	23
	Potential femoral vein donors	39	29	25	29	35	21
MB							
	Deaths - Males 17-39 yrs	77	66	49	57	42	51
	Exclusions	53	36	27	37	23	25
	Potential femoral vein donors	24	30	22	20	19	26
ON							
	Deaths - Males 17-39 yrs	626	585	496	502	438	466
	Exclusions	410	382	277	306	270	284
	Potential femoral vein donors	216	203	219	196	168	182
QC							
	Deaths - Males 17-39 yrs	514	427	354	352	348	283
	Exclusions	345	272	205	208	180	158
	Potential femoral vein donors	169	155	149	144	168	125
NB							
	Deaths - Males 17-39 yrs	53	42	36	31	45	26
	Exclusions	25	24	21	18	20	10
	Potential femoral vein donors	28	18	15	13	25	16
NL							
	Deaths - Males 17-39 yrs	34	32	30	20	31	26
	Exclusions	26	19	18	16	19	11
	Potential femoral vein donors	8	13	12	4	12	15

POTENTIAL FEMORAL VEIN DONOR ESTIMATE BASED ON NEW ENGLAND ORGAN BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
NS & PE							
	Deaths - Males 17-39 yrs	43	54	42	48	59	45
	Exclusions	21	36	24	29	37	27
	Potential femoral vein donors	22	18	18	19	22	18

POTENTIAL FEMORAL VEIN DONOR ESTIMATE BASED ON SOUTH DAKOTA LIONS EYE BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC							
	Deaths - Females 15-29 yrs	71	65	58	58	60	67
	Exclusions	30	29	28	25	22	33
	Deaths - Males 15-49 yrs	768	769	695	627	643	602
	Exclusions	449	438	364	337	367	302
	Potential femoral vein donors	360	367	361	323	314	334
AB							
	Deaths - Females 15-29 yrs	33	38	37	40	43	43
	Exclusions	25	23	20	20	22	26
	Deaths - Males 15-49 yrs	322	323	304	345	340	323
	Exclusions	233	237	212	228	232	217
	Potential femoral vein donors	97	101	109	137	129	123
SK							
	Deaths - Females 15-29 yrs	15	8	17	10	25	24
	Exclusions	9	4	6	1	17	14
	Deaths - Males 15-49 yrs	131	138	113	126	117	113
	Exclusions	60	79	64	67	66	71
	Potential femoral vein donors	77	63	60	68	59	52
MB							
	Deaths - Females 15-29 yrs	21	14	10	12	19	18
	Exclusions	11	7	6	2	14	12
	Deaths - Males 15-49 yrs	150	147	131	131	119	135
	Exclusions	99	102	77	89	75	88
	Potential femoral vein donors	61	52	58	52	49	53
ON							
	Deaths - Females 15-29 yrs	134	133	152	129	118	132
	Exclusions	81	75	84	76	66	80
	Deaths - Males 15-49 yrs	1,422	1,297	1,220	1,193	1,186	1,190

POTENTIAL FEMORAL VEIN DONOR ESTIMATE BASED ON SOUTH DAKOTA LIONS EYE BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
	Exclusions	1,003	905	750	771	810	789
	Potential femoral vein donors	472	450	538	475	428	453
QC							
	Deaths - Females 15-29 yrs	85	78	81	69	76	86
	Exclusions	37	44	45	34	41	53
	Deaths - Males 15-49 yrs	1,169	1,034	892	899	941	815
	Exclusions	819	713	584	593	579	530
	Potential femoral vein donors	398	355	344	341	397	318
NB							
	Deaths - Females 15-29 yrs	9	12	11	10	14	12
	Exclusions	2	6	4	3	9	9
	Deaths - Males 15-49 yrs	111	95	104	94	109	85
	Exclusions	63	59	68	59	67	50
	Potential femoral vein donors	55	42	43	42	47	38
NL							
	Deaths - Females 15-29 yrs	12	2	6	9	12	8
	Exclusions	10	1	4	5	4	4
	Deaths - Males 15-49 yrs	86	82	75	75	61	67
	Exclusions	54	51	46	47	34	36
	Potential femoral vein donors	34	32	31	32	35	35
NS & PE							
	Deaths - Females 15-29 yrs	14	17	14	12	15	13
	Exclusions	8	8	7	8	5	8
	Deaths - Males 15-49 yrs	99	123	125	119	144	135
	Exclusions	60	93	79	77	91	94
	Potential femoral vein donors	45	39	53	46	63	46

POTENTIAL SAPHENOUS VEIN DONOR ESTIMATE BASED ON NEW ENGLAND ORGAN BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC							
	Deaths - Females 17-49 yrs	446	451	472	482	439	427
	Exclusions	289	322	325	340	287	285
	Deaths - Males 17-59 yrs	1,406	1,468	1,371	1,301	1,285	1,308
	Exclusions	873	872	783	778	784	771

POTENTIAL SAPHENOUS VEIN DONOR ESTIMATE BASED ON NEW ENGLAND ORGAN BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
	Potential saphenous vein donors	690	725	735	665	653	679
AB							
	Deaths - Females 17-49 yrs	262	308	275	296	297	279
	Exclusions	217	236	193	225	221	219
	Deaths - Males 17-59 yrs	667	666	636	672	689	714
	Exclusions	493	485	463	461	496	516
	Potential saphenous vein donors	219	253	255	282	269	258
SK							
	Deaths - Females 17-49 yrs	110	103	107	106	125	125
	Exclusions	65	62	66	73	92	94
	Deaths - Males 17-59 yrs	299	286	247	278	271	263
	Exclusions	171	179	139	171	175	183
	Potential saphenous vein donors	173	148	149	140	129	111
MB							
	Deaths - Females 17-49 yrs	157	141	127	104	124	130
	Exclusions	112	108	97	73	95	95
	Deaths - Males 17-59 yrs	302	344	297	317	269	341
	Exclusions	198	244	204	215	174	247
	Potential saphenous vein donors	149	133	123	133	124	129
ON							
	Deaths - Females 17-49 yrs	1,102	1,107	1,029	1,067	1,020	1,004
	Exclusions	833	833	759	794	771	774
	Deaths - Males 17-59 yrs	3,076	2,847	2,791	2,761	2,830	2,809
	Exclusions	2,161	1,973	1,863	1,864	1,981	1,965
	Potential saphenous vein donors	1,184	1,148	1,198	1,170	1,098	1,074
QC							
	Deaths - Females 17-49 yrs	814	870	764	753	784	759
	Exclusions	617	677	557	600	592	579
	Deaths - Males 17-59 yrs	2,515	2,346	2,231	2,216	2,240	2,139
	Exclusions	1,747	1,689	1,568	1,558	1,543	1,511
	Potential saphenous vein donors	965	850	870	811	889	808
NB							
	Deaths - Females 17-49 yrs	85	73	84	95	83	80
	Exclusions	58	55	58	67	64	68
	Deaths - Males 17-59 yrs	258	224	235	235	255	248

POTENTIAL SAPHENOUS VEIN DONOR ESTIMATE BASED ON NEW ENGLAND ORGAN BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
NL	Exclusions	168	144	166	163	174	185
	Potential saphenous vein donors	117	98	95	100	100	75
NS & PE	Deaths - Females 17-49 yrs	61	64	64	72	60	66
	Exclusions	44	45	35	51	38	46
	Deaths - Males 17-59 yrs	186	183	181	163	162	179
	Exclusions	114	114	109	102	96	113
	Potential saphenous vein donors	89	88	101	82	88	86
	Deaths - Females 17-49 yrs	89	119	122	120	114	124
	Exclusions	62	96	87	93	86	95
	Deaths - Males 17-59 yrs	244	314	326	338	352	341
	Exclusions	165	224	234	230	244	244
	Potential saphenous vein donors	106	113	127	135	136	126

POTENTIAL SAPHENOUS VEIN DONOR ESTIMATE BASED ON SOUTH DAKOTA LIONS EYE BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
BC	Deaths - Females 15-29 yrs	71	65	58	58	60	67
	Exclusions	30	29	28	25	22	33
	Deaths - Males 16-65 yrs	2,193	2,271	2,083	1,944	2,018	1,965
	Exclusions	1,370	1,367	1,236	1,196	1,258	1,204
	Potential femoral vein donors	864	940	877	781	798	795
AB	Deaths - Females 15-29 yrs	33	38	37	40	43	43
	Exclusions	25	23	20	20	22	26
	Deaths - Males 16-65 yrs	1,024	1,090	1,024	1,022	1,102	1,095
	Exclusions	782	808	739	718	803	806
	Potential femoral vein donors	250	297	302	324	320	306
SK	Deaths - Females 15-29 yrs	15	8	17	10	25	24
	Exclusions	9	4	6	1	17	14
	Deaths - Males 16-65 yrs	515	470	433	464	467	422
	Exclusions	303	291	255	300	313	289

POTENTIAL SAPHENOUS VEIN DONOR ESTIMATE BASED ON SOUTH DAKOTA LIONS EYE BANK CRITERIA							
		Calendar Year					
		1995	1996	1997	1998	1999	2000
	Potential femoral vein donors	218	183	189	173	162	143
MB							
	Deaths - Females 15-29 yrs	21	14	10	12	19	18
	Exclusions	11	7	6	2	14	12
	Deaths - Males 16-65 yrs	514	545	471	537	456	572
	Exclusions	344	373	312	365	316	419
	Potential femoral vein donors	180	179	163	182	145	159
ON							
	Deaths - Females 15-29 yrs	134	133	152	129	118	132
	Exclusions	81	75	84	76	66	80
	Deaths - Males 16-65 yrs	5,224	4,839	4,643	4,583	4,611	4,645
	Exclusions	3,602	3,312	3,145	3,116	3,194	3,263
	Potential femoral vein donors	1,675	1,585	1,566	1,520	1,469	1,434
QC							
	Deaths - Females 15-29 yrs	85	78	81	69	76	86
	Exclusions	37	44	45	34	41	53
	Deaths - Males 16-65 yrs	4,267	3,949	3,755	3,687	3,675	3,593
	Exclusions	2,945	2,810	2,623	2,581	2,555	2,564
	Potential femoral vein donors	1,370	1,173	1,168	1,141	1,155	1,062
NB							
	Deaths - Females 15-29 yrs	9	12	11	10	14	12
	Exclusions	2	6	4	3	9	9
	Deaths - Males 16-65 yrs	431	388	412	388	417	398
	Exclusions	288	260	292	274	296	296
	Potential femoral vein donors	150	134	127	121	126	105
NL							
	Deaths - Females 15-29 yrs	12	2	6	9	12	8
	Exclusions	10	1	4	5	4	4
	Deaths - Males 16-65 yrs	304	287	303	290	265	282
	Exclusions	179	175	183	177	161	179
	Potential femoral vein donors	127	113	122	117	112	107
NS & PE							
	Deaths - Females 15-29 yrs	14	17	14	12	15	13
	Exclusions	8	8	7	8	5	8
	Deaths - Males 16-65 yrs	427	568	527	560	577	572

POTENTIAL SAPHENOUS VEIN DONOR ESTIMATE BASED ON SOUTH DAKOTA LIONS EYE BANK CRITERIA						
	Calendar Year					
	1995	1996	1997	1998	1999	2000
Exclusions	290	401	378	381	409	403
Potential femoral vein donors	143	176	156	183	178	174

Appendix G. Overview of Peer-Reviewed Literature on Tissue Donation & Family Consent Rates

			Number					
Tissue	Year	Country	Deaths	Eligible Cases	Referrals	Requests	Consents	Authors
Bone	1989	Netherlands	2,369	93			9	Jager et al. (1994)
Cornea	1991	Australia	365			323	212	Chopra et al. (1993)
Cornea	1993-1998	US			76,629		3,610	Heng et al. (2001)
Cornea	1999	France	1,112	329	145	55	39	Muraine et al. (2002)
Cornea	1989	Netherlands	2,369	1,548			105	Jager et al. (1994)
Cornea	1999-2000	Germany		264	214		144	Krieglstein et al. (2002)
Cornea	1998	Germany		94		77	56	Krieglstein et al. (2001)
Cornea	2000	France	1,044				62	Carrey et al. (2000)
Cornea	30-mos in 1990s	France				151	108	Muraine et al. (2000)
Cornea	1999-2000	France		455		334	222	Gain et al. (2002)
Cornea	2000-2001	France		868			477	Noury et al. (2003)
Cornea/Tissue	1992-1993	US	10,681	626		417	124	Siminoff et al. (1995)
Cornea/Tissue	1989	US	233	41		27	8	Siminoff et al. (1994)
Heart valve	1990-1995	Australia				305	247	Haire & Hinchliff (1996)
Heart valve	1989	Netherlands	2,369	58			0	Jager et al. (1994)
Tissue	1996-1999	Australia				977	501	Beard et al. (2002)