Health Care Technology Management
Durham College BHCTM Honours Degree (BHCTM)
A separation between the user and the technology begins

THE IDEA FOR FORMAL EDUCATION EMERGED LONG, LONG AGO...

A QUOTE FROM THE SURGEON GENERAL U.S. ARMY JULY 11, 1919

“IT IS BELIEVED TO BE BETTER POLICY TO HAVE A CENTRAL REPAIR ESTABLISHMENT IN THE MEDICAL DEPARTMENT TO WHICH SURGICAL INSTRUMENTS AND DELICATE LABORATORY EQUIPMENT CAN BE SENT FOR REPAIRS”

https://blog.prescribewellness.com/2016/04/the-great-divide/
What are the consequences when BMTY is not available? **A Communications Gap!**
HCTM and CED/BMTY is a Great Idea!

What is Health Care Technology Management?
HCTM - An Integrated Program of Study

- Business
- Life Sciences
- Medical Electronics
Clinical Engineering at the Point of Care

HCTM supports corporate goals through to clinical outcomes

Board of Directors ➔ C-Suite ➔ Clinical Depts. ➔ HCTM & CED ➔ Point of Care

Clinical Service Plan
Medical Device Committee (MDC) Multidisciplinary Committee
Medical Device Policy (MDP)
Strategic HTM Plan
HCTM detailed planning, delivery & implementation (ESP action plan)
Operational & Life-Cycle Management
Clinical Engineering at the Point-of-Care

Top Level Document

1. Strategic Technology Plan
2. HCTM Operational & Life Cycle Management
3. Clinical Engineering at the Point-of-Care

1. 2. & 3. Interlocked and interdependent
Example Topic, HCTM & Life Cycle Equipment Management

① Managing Medical Equipment Over Its Life Cycle
   - Purchasing
   - Stages in the total cost of ownership

② Approaches to Financing the Life Cycle of Medical Equipment

③ Extracting Optimal Benefit from Medical Equipment

Active HCTM includes decisions affecting the Cost of Ownership at the following three-stages of a technologies life cycle:

Total Cost of Ownership = ① + ② + ③

① Acquisition Costs +
② Operational Costs +
③ Disposal Costs

A cost is associated with all three stages.

① Acquisition: (TAWG)
- Assessing the requirements
- Specifications
- Evaluation and selection
- Installation and/or commissioning

② Operational life support: (reoccurring)
- Training
- Supply of utilities and consumables
- Technical and Applications support
- Asset management (PM & DM)
- Governance

③ Disposal: (one-time)
- Removal from service
- Possible sale or donation
- Decommissioning
- Disposal as waste

Your job is to make decisions hopefully on evidence, but not always.
Active Life-Cycle Management

Active management of a technology over its lifespan

- Optimize its clinical contribution
- Minimize its operational cost
- HCTM may initiate a replacement decision

Merriam-Webster. Active characterized by action rather than by contemplation or speculation
Active Management - Replacement Initiated by HCTM

- **Acquisition Costs ~20%**
- **Life Cycle Costs ~ 80%**

  - **Support Replacement Decisions**
    - If a repair cost is 40%-50% the Replacement Asset Cost (RAC)
    - Lack of support
    - Technology obsolescence
    - Standards change
    - Clinically inadequate
    - Parts no longer available
    - Interoperability
    - Unreliable (downtime)
    - Recommendation of professional organization / society AAMI
    - Many more…
HCTM Unlock the Potential of Technology

CRISPR gene editing
Nano Tech bots, particles
Neural Networks
Robotic surgery
Self diagnostic wearables

Brain machine I/F
Artificial organs
AI enabled technology
Bionic eyes, hearing, etc.
Robotic Check-ups

The Gap Between Medical Science and Biomedical Engineering Grows Ever Closer
St James’s Hospital, Dublin, Ireland in association with a local University are exploring both an undergraduate and graduate degree in HCTM.
Toronto’s SickKids announces first-of-its-kind artificial intelligence position
Dr. Anna Goldeberg
Richard Tidman: Merging HTM and Primary Care: The Rise of the HTM-MD?
by AAMI, Posted on March 23, 2018, Healthcare Technology Management

Note: This post appeared in abbreviated form as the Final Word article in the March/April 2018 issue of BI&T.

There was a time, not long ago, when predictions were easier. A time when the pace of change was less dramatic and disruptive, and medical technology turnover was measured in years. Those days are gone. A coalescing of technology, information, and analytics is underway on a global scale; the momentum of this metamorphosis is inescapable, and the potential for better care is unlimited.

Picture this: You are a student enrolled in the HTM graduating class of 2022 and have just gone through a rigorous three- or four-year program. (HTM programs may lengthen.) Your program of study includes classes in programming, machine learning, simulation, augmented reality, artificial reality (AR), robotic surgery, nanotechnology, point-of-care analytical tools, wearables, gene-editing technologies, tele-everything—and all of this in addition to core courses in life sciences, electronics, and standards, which are taught in current HTM programs. The virtual reality global classroom is ubiquitous. Professors are using the latest information and communications technologies (ICTs) to reach their global learners and, coincidentally, a variation of these same ICTs are embedded in a wide variety of medical technologies.

Now picture this: You are a global learner enrolled in the HTM graduating class of 2032, who has just gone through a rigorous four-year program. Classes are fully immersive in AR and delivered using the latest technologies to match your individual learning competencies and style. You are given a project to mull over and decide to download the latest application in artificial intelligence (AI). Data streams into an AI app from a global repository consisting of both historical data and real-time data straight from point-of-care devices to your personal device. Data are mined for both clinical content and relationships to medical technology and health outcomes (among other things). The success of your project is determined by your capacity to understand contemporary medical technology, how to apply the appropriate AI, your access to a certain data set, and, of course, how you deal with security. The final report answers the project's question(s) with unprecedented accuracy founded in impeccable sources.

With these scenarios in mind, let’s address and discuss the title of this article. If the predicted date for singularity is true, or even close, then it must also be reasonable to presume that the analytical capacity and diagnostic accuracy of AI will meet and/or exceed its human primary care counterpart. Given that you, the HTM professional, are healthcare’s interdisciplinary technology expert and technology implementer, it takes little imagination to visualize a new program of study (i.e., university curriculum) where both you and aspiring primary care physicians enter the same program only to choose between specializing in HTM or becoming an HTM–medical doctor (MD) later in the syllabus. Your interests in the provision of healthcare are fundamentally shared; however, the principal differences for the HTM-MD stream are additional life science courses and an emphasis on personal patient interaction.

Not long from now, primary care may be delivered by professionals whose interdisciplinary skills are more heavily weighted in all things technology rather than the life sciences. This is not to suggest that the primary care physician will disappear, but rather that the analytical skills and practice of medicine will be altered forever because of technology, coordinated global resources, and AI.

The attributes of the HTM-MD will likely include a dedication to lifelong learning, a mindset that embraces innovation and change, and integrated, global medical knowledge. Most importantly, the HTM-MD’s focus will remain the same as always: providing quality healthcare, one patient at a time.

Richard Tidman is a professor at Durham College in Oshawa, Ontario, Canada.
Progress is the fruit of the freedom of thought...
Richard Feynman
In Closing

The HCTM is an emerging professional skilled to unlock the potential of technology

Think about how a HCTM could improve the delivery of care in your organization and if you want to become a future leader in HCTM

- **Past** - healthcare saw little change for thousands of years
- **Present** - the delivery of healthcare is dependent on technology and the BMTY
- **Future** - healthcare's improvements will come from technology and those who can extract the greatest value from the technology will lead, the future belongs to HCTM
Honours Bachelor of Health Care Technology Management (BHCTM)

The BHCTM program needs you!
School of Science and Engineering Technology (SET)

FIELD PLACEMENT OVERVIEW

The 420-hour field placement in Durham College’s (DC) Honours Bachelor of Health Care Technology Management (BHCTM) degree program helps students develop in-depth knowledge and skills required in today's medical technology and the health care sector. Students may be placed in a community hospital, with a medical device manufacturer, regulatory agency, Local Health Integration Network (LHIN), or similar organization.

Becoming a field placement host allows you to positively influence the next cohort of resilient, job-ready graduates so that they can effectively work within the community you serve.

WHAT ARE THE BENEFITS OF BEING A FIELD PLACEMENT HOST?

This is an opportunity to meet, train and consider a potential future employee. Students arrive for their field placement eager to work and put their classroom training to good use.

This is also an opportunity to mentor and supervise an aspiring professional and provide them with a meaningful experience, which can be a new source of esteem and motivation within the workplace for your current staff.

WHAT DOES A FIELD PLACEMENT HOST DO?

Typically, field placement hosts provide:
• On-the-job training in an encouraging and supportive learning environment.
• Organization and position orientation for students.
• A minimum of eight hours per week of formal supervision.
• Meaningful and relevant tasks to complete.
• Clear instructions and availability to answer questions.
• Ongoing constructive feedback.

Students will be required to demonstrate competency in a range of areas including:
• General business practices
• Life sciences
• Management
• Medical electronics
• Professionalism and ethics
• Working in a clinical environment

WHAT DOES THE COLLEGE PROVIDE FOR THE FIELD PLACEMENT HOST?

Each field placement student in the BHCTM program is assigned a college advisor from DC who oversees their placement to ensure that they are meeting all of the required components in order to pass. The advisor also acts as a liaison between the field placement agency, the student and the college, providing direction and support for the field placement host as needed.

Please note: all students will be required to complete any necessary work training certificates prior to starting their field placement and will have Workplace Safety & Insurance Board (WSIB) coverage through the Ministry of Training, Colleges and Universities (MTO).

CONTACT US

For information about becoming a field placement host:

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Mary Rich-Kristl
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CALL US!

If you require an alternative format of this publication, contact marketing@durhamcollege.ca.
Admissions

• Ontario Secondary School Diploma or Mature Student Status
• Six Grade 12 U or M courses with a combined minimum average of 65 per cent including:
  o Grade 12 U English
  o Grade 12 U mathematics or Grade 11 U mathematics with a minimum of 70 per cent
  o Grade 11 or 12 U biology with a minimum of 60 per cent

OR

• Six post-secondary credits with a combined minimum average of 65 per cent including:
  o College or university English or communications
  o College or university math
  o College or university biology with a minimum of 60 per cent

RECOMMENDED:
• Grade 12 U physics
• Grade 12 U chemistry
Mentorship

Maurice Jackson

Leadership!

An interdisciplinary professional prepared to (lead)
- The dept. of BMTY/Clinical Eng.
- Responsible for planning a holistic technology strategy
- Optimize the value of medical technology for the organizations stakeholders
  - Manage healthcare's transition to a technology future

Interdisciplinary POS
- Life Sciences
- Business Practices and Leadership
- Medical Technology

HCTM is not an engineering discipline, business management or medical speciality, it is however a combination of all three
AAMI 1967–2019
CMBES 1965–2019
Fanshawe 1970’s

Electronic +
CBET courses

Learned on the job

https://www.google.ca/search?q=biomedical+engineering+fanshawe+coll

The Dawn of Advocacy Groups & Formal Education 1960-late 1990’s

Figure 1 - The Knowledge Doubling Curve
Advanced Diploma for BMTY late 1990's-2019
# My Involvement in HCTM

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Question Two

What is a College Degree?
A College Degree

Colleges in Ontario began offering degree programs in 2002 to provide a unique option for students looking to integrate theory with intensive applied learning.

- Career-focused education that combines the best of both theoretical knowledge and analytical skills (university education) with applied skills (college education)

- Students graduate with the comprehensive theory and practical experience required by employers in today's competitive and quickly evolving workforce.

- Degree curricula is developed in collaboration with Program Advisory Committees comprising subject matter experts, employers and leaders in the field

BHCTM graduates are eligible Masters level studies
HCTM-SEM1
- Human Anatomy and Physiology
- Communications I: Critical Thinking and Writing
- Electrical Circuits for Health Care Technology
- Introduction to Health Care Technology Management
- Math for Health Care Technology Management

HCTM-SEM2
- Introduction to Economics
- Fundamentals of Digital Electronics
- Biomedical Nomenclature and Devices I
- Physics for Health Care Technology Management

HCTM-SEM3
- Financial Management and Accounting
- Biomedical Nomenclature and Devices II
- Medical Electronics I
- Quantitative Methods in Health Care Management I

HCTM-SEM4
- Biomaterials
- Medical Electronics II
- Quantitative Methods in Health Care Management II
- Canadian Health Care System

HCTM-SEM5
- Health Economics
- IT Concepts in Health Care Technology Management
- Health Care System Process Improvement
- Biomedical Instrumentation Research and Design I

HCTM-SEM6
- Networking and Information Exchange
- Health Care Risk Management and Patient Safety I
- Project Management
- Biomedical Instrumentation Research and Design II
- Preparing for Professional Practice
- Principles of Marketing and Sales Management

HCTM-SEM7
- Diagnostic Medical Systems I
- Health Informatics & Analytics
- Health Care Risk Management & Patient Safety
- Health Care Technology Assessment & Mgmt Project I
- General Elective

FIELD PLACEMENT

HCTM-SEM8
- Diagnostic Medical Systems II
- Management in Health Care
- Ethics/Workplace Practices
- Health Care Technology Assessment & Mgmt Project II
- General Elective
References