International comparisons of selected service lines in seven health systems

ANNEX 15 – CASE STUDIES: PAEDIATRIC CARE AND THE ELECTRONIC CHILD HEALTH NETWORK (eCHN) IN ONTARIO

Evidence Report

October 27th, 2014

Virtual paediatric networks – why this case study?

Why this case study?

- Rates of paediatric inpatient admissions are lower in Ontario compared to many other health systems:
  - 31 per 1,000 population in the 0-19 years age group compared to 112 per 1,000 in the same age group in the NHS in England
- Lower rates of paediatric admissions are likely to be due to a number of factors including differences in paediatric primary care but the virtual child health network (eCHN), which connects all providers, may also play a role

Potential impact on costs

- Cost savings from the Ontario model include:
  - Lower levels of paediatric admissions
  - Reduction in duplicated tests/investigations
- The eCHN has cost around £33m (CAN$60m) in its first 10 years of operation (2000-2010) and employs around 50 staff. The main source of funding is the Ministry of Health and Long Term Care though the main tertiary paediatric provider in the province (Sick Kids in Toronto) also provided start-up funding of £4m (CAN$7.5m) which was matched by the Ministry[1]

Issues of comparability

- Provision of inpatient paediatric services is broadly similar in Ontario and the NHS in England with a range of providers from tertiary/specialist to short stay only units, with quite clearly differentiated intakes
- The main differences in Ontario, compared to the NHS, are:
  - Paediatricians based in primary care – in the NHS this role would always be played by a General Practitioner
  - Shared electronic health record used by almost all providers of paediatric care

Potential impact on quality

- There is insufficient data to make direct comparisons on the quality of paediatric hospital care between Ontario and the NHS in England
- It is not possible to attribute benefits (reductions in admissions and unnecessary investigations) to individual components of the Ontario model of care are not dependent on each other, e.g.:
  - An eCHN could be introduced without restructuring services
  - Paediatricians in primary care may bring benefits with or without an eCHN

1 Andrew Szende and the Development of the electronic Child Health Network, May 01, 2010 - Healthcare Quarterly, http://www.echn.ca/about-media-details.php?id=5

Executive summary

- Paediatric services in Ontario are delivered through an integrated network of providers
- The integrating mechanism is the electronic Child Health Network which connects providers from all settings – including primary, acute, rehabilitation and community services – through a shared and comprehensive paediatric patient record.
- The eCHN has been in operation for 15 years and, through a process of gradual expansion, now reaches almost all paediatric providers in the province and includes 80% of children in the region
- Acute provision is relatively specialised, compared to many other health systems, with only limited short-stay and minor surgical procedures taking place outside of specialist children's hospitals
- A set of guidelines describe the scope of services that different levels of paediatric providers should deliver. These are not mandatory but are broadly followed. This division of services is also driven by parents who have a free choice of provider and tend to seek more specialist care (even when the issue at hand is not necessarily of a complex nature) and will often bypass more local services.
- Specialist paediatric providers support care closer to home through extensive use of telemedicine for outpatient consultations and virtual multi-disciplinary team educational and case review meetings with clinicians in more remote locations

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- **Impact – why this case study?**
- Description – what did they do?
- Enablers – how were they able to do this?

The electronic Child Health Network supports quality and efficiency across all settings creating a virtual network of paediatric provision

(The) eCHN improves patient care on several fronts. One, I can see what's been done elsewhere, so it **avoids duplication of effort**, **duplication of testing**. I can share information, things that I've done here, so hopefully it does the same in the other institutions. It also **allows the families to see what's happening**, what's going on. And one of the most powerful parts of it, I think, is I can draw, for example, x-rays - - and I can show the family, remember that test you had? This is what it is, this is what they're talking about.

Paediatrician in group practice

Some of the kids we see are **very complex patients who are followed closely at Sick Kids but then they have an illness and go to the nearest hospital** and show up in the emergency room or clinics …. so with children who have been seen elsewhere in the past, I will always check to see if I can get that information on eCHN. And it's a very easy thing to check, it's very easy to access.

On a typical 24-hour shift, I might use eCHN maybe half-a-dozen times - and some of that may not be necessarily because of the child in front of me but it's to follow-up on a child that I've sent down to Sick Kids … partly because of my interest in the patients and partly because I want to learn something.

Paediatrician in a district hospital

In the past, we had to make decisions based on the information that we had to hand which was at best incomplete. **If the medical history is immediately available to me it will, and does, change the way we practice.**

Doctor in paediatric A&E

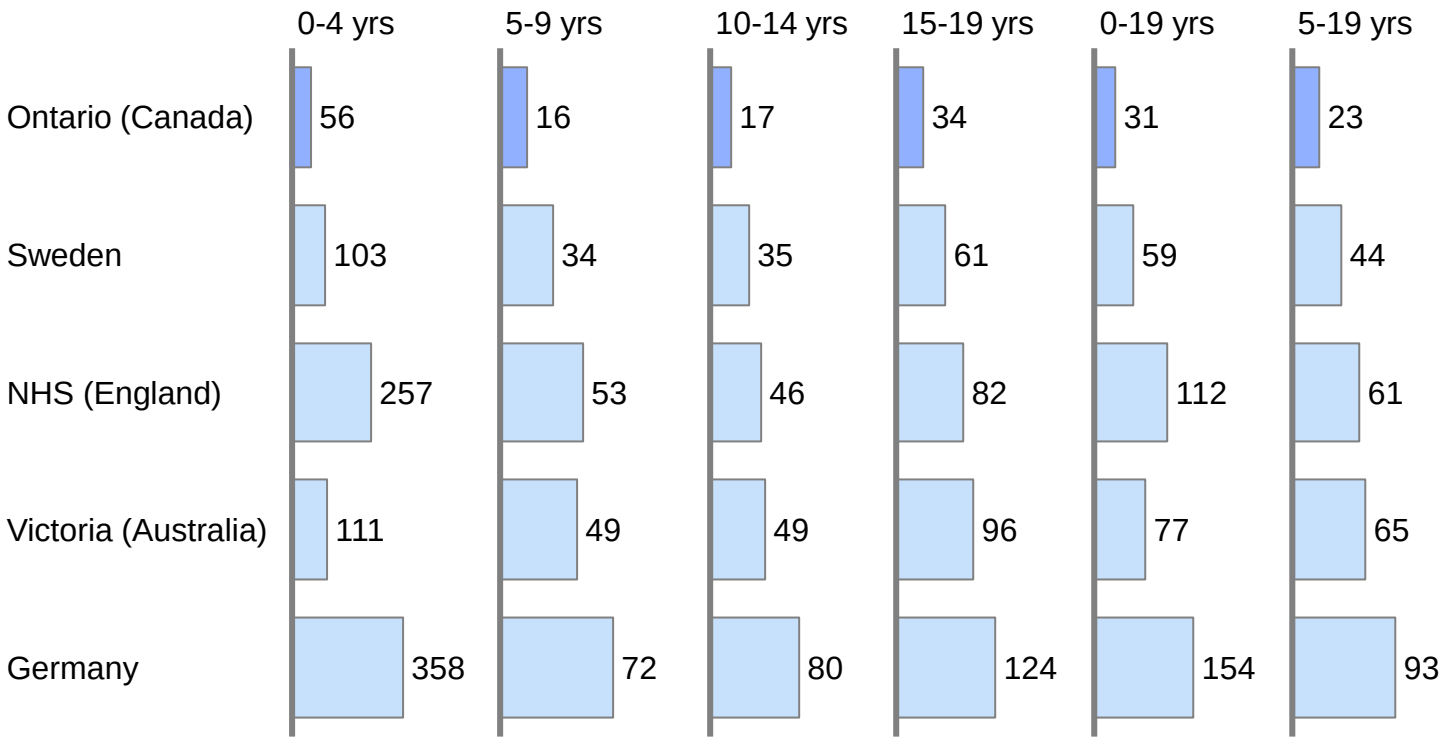
SOURCE: eCHN website

The Ontario model of paediatric care results in low rates of IP paediatric admissions compared to some other health systems

PRELIMINARY

Inpatient acute hospital admission rates by age group, 2012/13

Rate per 1,000 population



Degree of centralisation

- Ontario (Canada): Highly centralised
- Sweden: Highly centralised
- NHS (England): Some centralisation
- Victoria (Australia): Some centralisation
- Germany: Some centralisation; overall high levels of supply/provision

Comparability of data – important caveats:

- Rates for Sweden and Germany include psychiatric/mental health admissions (excluded from other regions). In the NHS, these account for ~1% of paediatric admissions
- Rates for Germany also include day cases (excluded from other regions). In the NHS, these account for ~25% of admissions. If German rates were adjusted for estimated day cases and psychiatric admissions (on the basis of NHS assumptions), the admission rate for the 0-19 age group would fall to 115 and the 5-19 age group would fall to 70 per 1000

SOURCES: CIHI (Ontario); HES (NHS); Swedish Board of Health and Welfare (Sweden); VDL (Victoria); Federal Statistical Office (Germany)

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In the early 2000s, the Ontario MoHLTC[1] asked providers to review the configuration of inpatient paediatrics and maternity services

Situation

- In 2003, the Ontario Ministry of Health and Long Term Care asked the Greater Toronto Area Child Health Network (a member-ship organization of 19 acute hospitals and 9 community centres) to look at ways of providing better, more consistent, standardized and sustainable care in paediatric and obstetric services which at that time were provided by most acute hospitals

- The review was prompted by concerns relating to:
  - **Workforce shortages** – particularly paediatrician coverage in district hospitals
  - Challenges faced by some providers to maintain **skill base and service mix**
  - **Declining demand** for inpatient paediatric beds
  - Increasing number of **children with complex chronic needs**

Approach

- The CHN created an Internal Review Committee which published a series of reports in 2004 and 2005 setting out plans for a reconfiguration of acute maternity and paediatric services

- The recommendations include **de-coupling birthing services from inpatient paediatrics** and **reconfiguring acute paediatric services into three service tiers**:
  - Regional hubs
  - Short stay acute providers
  - Ambulatory providers

- In parallel with the work of the Internal Review Committee, the main tertiary provider (Sick Kids) developed and expanded an **electronic Child Health Network** to connect all providers in the province through a single, shared, integrated patient record for children

Ongoing change

- Since the CHN published its plans, three new bodies have emerged which all play a role in strategy and oversight of paediatric and obstetric services::
  - In 2006, the MoHLTC set up regional health governance bodies, called **LHINs** (Local Health Integration Networks) with **responsibility for strategic oversight and commissioning**
  - The **PCMCH** (Provincial Council for Maternal and Child Health) was set up in 2008 **responsible for setting and rolling-out best practice clinical guidance**
  - The BORN (Better Outcomes & Registry Network) was set up in 2009, **responsible for audit and data sharing** – which has thus far focused primarily on perinatal services

1 Ministry of Health and Long Term Care

SOURCE: Strengthening the maternal, newborn and paediatric system by design, IRC Phase 3 report: Final advice and recommendations of the Internal Review Committee, Child Health Network of the Greater Toronto Area, March 2005; Expert interviews conducted by research team

Spectrum of paediatric provision in Ontario

EXCLUDING MENTAL HEALTH

Primary care	Community care	District acute hospitals (with IP paediatrics)[2]	Regional Children's Health Centre	Tertiary/ quarternary services
▪ Primary care is provided by Family Practitioners (GPs) and Paediatricians working in single-handed or group practices ▪ Patients have a free choice of provider type (Paediatrician or GP/FP) but availability of Paediatricians is lower in remote areas	Regional network of 20 Children's Treatment Centres[1] provide: ▪ Physiotherapy ▪ Speech and language therapy ▪ Occupational therapy ▪ Audiology ▪ Weight management ▪ Family/social support ▪ Some OP clinics	▪ Wide range of ambulatory services ▪ A&E including treatment for sutures, fractures and other common emergency presentations ▪ Short stay admissions (<48 hours) ▪ Day/minor surgery in patients aged >1 yr	▪ Wide range of specialist and sub-specialty inpatient and ambulatory care ▪ Full scope of paediatric A&E ▪ Uncomplicated surgery in patients aged >1 month	▪ Full scope of care including complex treatment and diagnostics ▪ Highly specialist services: – Oncology – Major trauma – Organ transplant – etc ▪ PICU

In many parts of Ontario, these units are combined

Almost all paediatric providers are connected via the electronic Child Health Network

EMS (Ambulance) system support transfer to the most appropriate setting (and between settings)

1 Equivalent to 1 CTC per 680,000 population . It is estimated that 58,000 children in Ontario use their services (equivalent to 3,900 per CTC)
2 District hospitals (similar to NHS DGHs) are called "community" hospitals in Ontario

SOURCE: Strengthening the maternal, newborn and paediatric system by design, IRC Phase 3 report: Final advice and recommendations of the Internal Review Committee, Child Health Network of the Greater Toronto Area, March 2005

Recommended tiers of acute paediatric provision

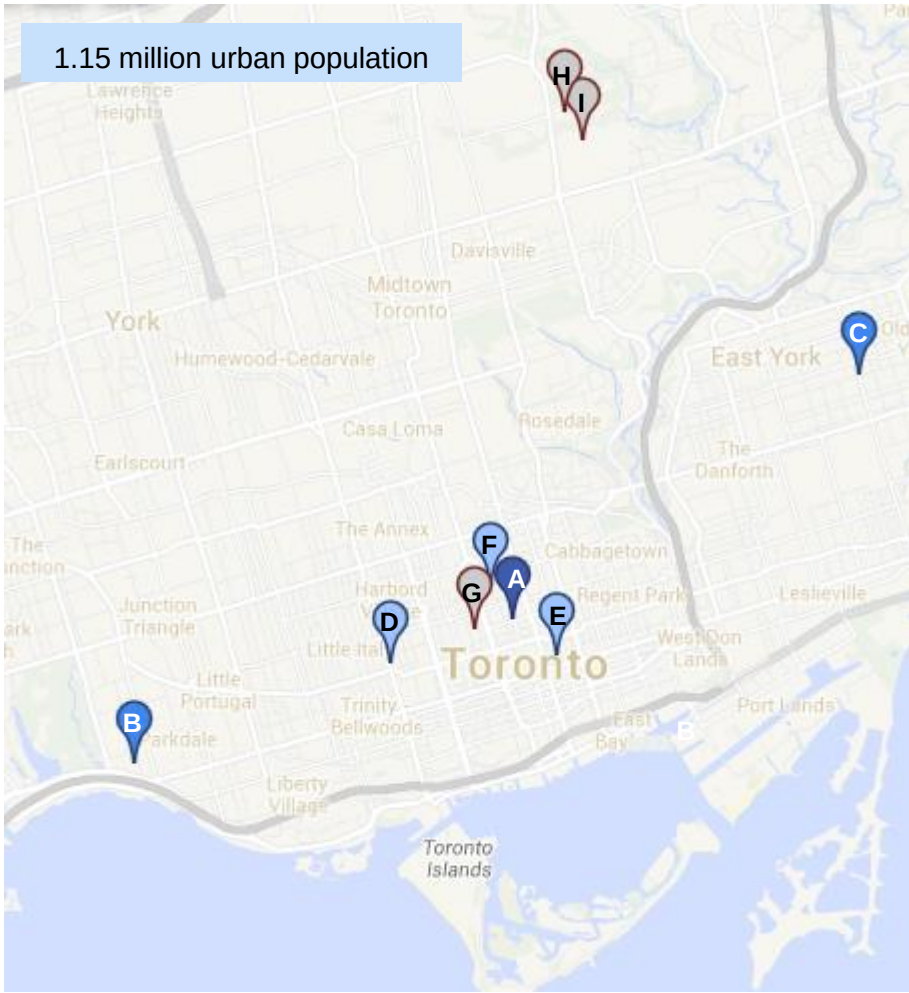
	Scope of clinical care	Scale
Tertiary/quarternary providers	▪ Complete scope of tertiary medical and surgical including sub-specialty care for provision of complex diagnostic and therapeutic procedures ▪ Tertiary complex continuing care and rehabilitation (IP, day case and outreach)	▪ 1 per ~3 million population
Regional Children's Health Centre	▪ Complete scope of secondary paediatric services including: – Routine paediatric sub-specialist care and monitoring: e.g. endocrinology, nephrology, cardiology, neurology – Patients with significant co-morbidities or chronic illness likely to complicate their treatment (even if predicted LOS <48 hrs) – Uncomplicated surgery in patients aged >1 month of age and skilled staff available – Patients with stable tracheostomies (not fresh post-operatively) – Patients with complex, chronic health care needs and/or those awaiting placement in a paediatric long-term care facility – Patients requiring G (gastric) or G/J (gastro-jejunal) tube feeding or TPN (total parenteral nutrition) – Patients with central venous lines or requiring intermittent subcutaneous injections via insuflon – Patients requiring palliative care	▪ 1 per ~1.25 million population (if no tertiary hospital in catchment area) ▪ 26 inpatient paediatric beds (minimum) ▪ 14-18 inpatient paediatric patients per day on average (14 is based on quality thresholds and 18 is based on efficiency)
District acute hospitals with inpatient paediatrics	▪ Short stay IP care with limited acuity and high probability of LOS <48 hours (predicted pre-admission to minimize transfers mid-treatment) ▪ Admitted children should be expected to show rapid improvement ▪ Day surgery for children >1 year ▪ Emergency care for minor trauma: e.g. sutures, fractures ▪ After-hours/walk-in clinic (may be staffed by Family Practitioners) ▪ Short Stay inpatient unit and observation unit in ED ▪ Ambulatory care (determined through regional planning)	
District acute hospitals without inpatient paediatrics	▪ Ambulatory clinics (determined through regional planning) ▪ Emergency service including observation capability to determine need for transfer and admission (expectation that over time demand for this will reduce) ▪ Paediatric coverage and management for neonates (if maternity on site)	

Important notes:
- In practice, there is some local variation to this guidance (which is not mandatory)
- The PCMCH is currently reviewing organisation of paediatric services and a new framework may be developed in due course

SOURCE: Strengthening the maternal, newborn and paediatric system by design, IRC Phase 3 report: Final advice and recommendations of the Internal Review Committee, Child Health Network of the Greater Toronto Area, March 2005; Expert interviews conducted by the research team

Tiers of acute paediatric provision in Central Toronto

Central Toronto LHIN region – map of acute providers



Regional Children's Health Centre

A The Hospital for Sick Children (Sick Kids)
- Paeds A&E (including paeds trauma centre)
- 370 IP paeds beds and 36 PICU beds
- Secondary provider for LHIN (1.1m population)
- Tertiary/quarternary provider for province (13.5m population)
- Paeds cardiac surgery (1 of 2 national providers serving 35m population)

District acute inpatient paeds providers

B St Joseph's Health Centre
- Paeds A&E
- 8 IP paeds beds and 6 paeds day surgery beds

C Toronto East General Hospital
- Paeds A&E
- IP paeds programme affiliated to Sick Kids

District acute providers without IP paeds

D Toronto Western Hospital

E St Michael's Hospital

F Toronto General Hospital

Other providers

G Princess Margaret Cancer Centre
- Very limited paeds - paeds oncology services managed by Sick Kids

H Sunnybrook Hospital
- No general IP paeds but regional trauma/burns centres based here which may admit paeds patients in some cases (paeds trauma based at Sick Kids)

I Holland Bloorview Kids Rehabilitation Hospital
- Secondary/tertiary specialist paeds rehab provider

SOURCE: LHIN websites; provider websites

Tiers of acute paediatric provision in East Central Ontario

East Central Ontario LHIN region – map of acute providers

1.4 million suburban and rural population

~170 km (16,673 km^2)

Regional Children's Health Centre

A **Sick Kids** (see previous page)

District acute inpatient paeds providers

B **Scarborough Hospital**
- Paeds A&E, OP, day surgery and short-stay IP

C **Rouge Valley Health System** – Ajax site
- 10 bed paeds IP unit - staffing shared with maternity unit

D **Lakeridge Health System** – Osawa site
- 14 bed unit for paeds day/minor surgery and short stay IP
- Children's Treatment Centre (rehab) – separate site and management

E **Northumberland Hills Hospital**
- Paeds day surgery and minor IP admissions

F **Peterborough Hospital**
- Paeds A&E, OP and minor admissions
- Children's Treatment Centre (rehab) – separate site and management

District acute providers without IP paeds

G **Ross Memorial Hospital**
- Paediatric Decision Unit (staffed by Emergency Medicine Specialists) for <24 hr observation pre transfer/discharge

H **Lakeridge Health System** – Bowmanville site

I **Campbellford Memorial Hospital**

J **Uxbridge Hospital**

K **Lakeridge** – Port Perry site

L **Haliburton Highlands** – Haliburton site

M **Haliburton Highlands** – Minden site

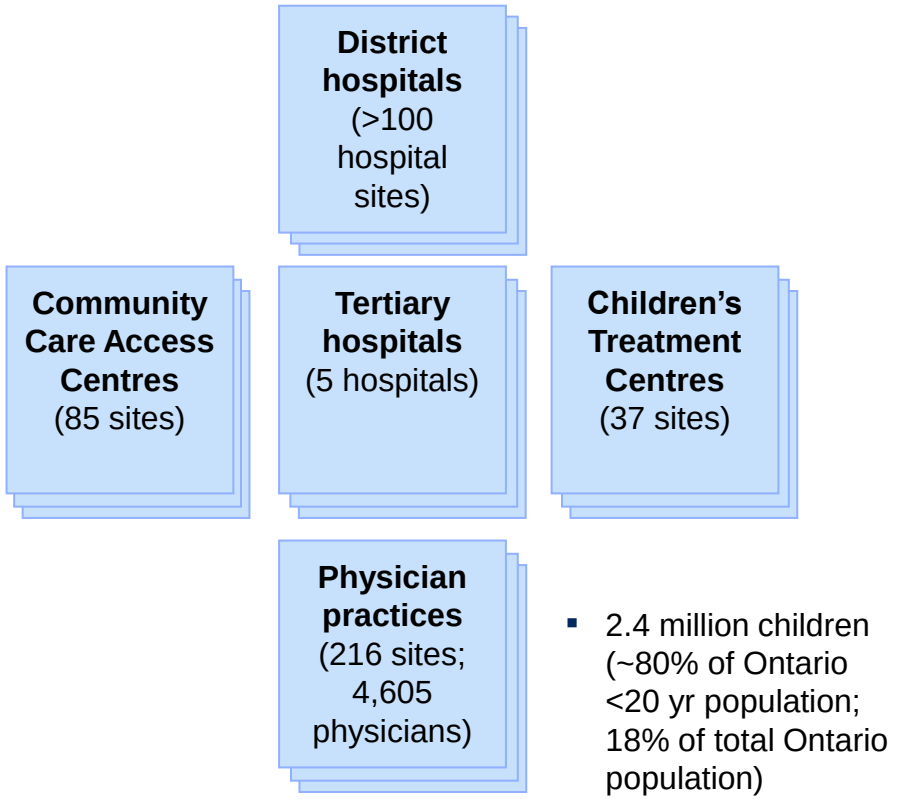
Other providers

O **Rouge Valley Health System** – Centenary site
- Paediatric oncology satellite clinic (ambulatory care affiliated with Sick Kids)

SOURCE: LHIN websites; provider websites

eCHN – what is it; how does it work

eCHN membership network



- 2.4 million children (~80% of Ontario <20 yr population; 18% of total Ontario population)
- 2.2 million patient encounters/year

Overview

- Founded in 1999 by The Hospital for Sick Children in Toronto
- Government-funded not-for-profit organisation
- Voluntary participation but extensive outreach work to encourage and support participation including user champions, train-the-trainer sessions and one-to-one support and user feedback
- Pulls data from any clinical information system with no IT changes required – the eCHN team worked with all hospital application vendors in Ontario to ensure the system was intra-operable
- Provides a comprehensive, longitudinal record:
  - Data on all admissions, discharges, transfers and attendances (in all settings)
  - Laboratory test results and reports (direct from the laboratory information systems)
  - Radiology images and reports
  - Clinic and surgical notes
  - Discharge summaries and consultant letters
- Disease-specific tools and interfaces - either in use of in development:
  - Diabetes tracking tool
  - Oncology
  - Cardiology
  - e-Referrals tools

SOURCE: eCHN website: Szende A, Ontario's province-wide paediatric electronic health record, Advances in Information Technology and Communication in Health, 2009; Expert interviews conducted by the research team

Child Health Network implementation timeline

1994

Sick Kids in Toronto develops a vision for a **"hospital without walls"** supporting:

- Sharing of knowledge and expertise
- Care closer to home
- Continuity of care

1997

*The Ontario MoHLTC supports the creation of the **Child Health Network of the Greater Toronto Area** (CHN of GTA) covering all providers of paediatric services*

1999

Pilots across five sites and a cross-section of provider types test **proof of concept** of electronic child health network (eCHN)

2000

***eCHN goes live** and the first physician practices join the network*

2004/5

Commissioned by the he MoHLTC, the CHN of GTA **reviews potential configuration options for perinatal and paediatric services** to address specific challenges:

- Workforce shortages
- Declining demand for IP paeds beds
- Increasing number of children with complex chronic conditions

2006

- ***LHINs created***
- *eCHN continues to expand reaching all 5 3^{o} paediatric centres in Ontario*

2008

Implementation of configuration recommendations (particularly in maternity) are challenged and partially stalled

The **Provincial Council for Maternal and Child Health** (PCMCH) created with a remit to disseminate best practice guidance

2009

***BORN Ontario** established with mission to improve monitoring and information sharing relating to perinatal outcomes*

2010

CHN of GTA disbanded as role largely replaced by LHINs, PCMCH and BORN with shift towards sharing of best practice and information/ audit rather than strategic planning and

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Enablers

Technology

- The efficiency and quality of paediatric services in all settings in Ontario are enhanced by the use of shared, integrated health record:
  - Reduces duplication of testing and decision-making
  - Supports rapid decision-making and treatment in emergency settings
  - Supports chronic disease management and follow-up care closer to home
- The technology used – which can pull from any system as does not require technology change or investment on the part of the provider – is key

Supportive government

- The Ministry of Health and Long Term Care provided funding and policy support to the eCHN
- At various points, the MoHLTC has supported provider membership groups to develop configuration guidance and plans – though note that implementation remains highly political and has only partially been delivered with some units identified in planning guidance as sub-scale remaining open

Strong engagement

- eCHN relies on “champion users” within organisations to promote uptake and sustain momentum

Patient behaviours

- The landscape of paediatric provision is largely reflective of parents preferences to have enhanced access to specialist care – through a world-renowned specialist provider – where possible and appropriate, supported by affiliated and integrated care closer to home