• The 2010 Health Ministerial Communique noted that health care quality improvement requires
  – more effective use of data that has been already collected

• Health Committee in December 2010 endorsed further work to support development of health information systems to provide comparable quality indicators

• In May 2011, the HCQI agreed to undertake a report on best practices in electronic health record system design and implementation to enable data to be extracted to produce quality indicators
For our study we defined electronic health record systems as:

*The longitudinal electronic record of an individual patient that contains or virtually links together records from multiple electronic medical records which can then be shared (interoperable)*

Such systems aim to improve the quality, safety and efficiency of health care.
**Desired qualities of an EHR system**

- Desired qualities of EHR system records include:
  - Accuracy, completeness, comprehensiveness, reliability, relevance, timeliness and accessibility
- These qualities match those of any statistical system
- If these desired qualities are reached...
  - EHR systems could support monitoring and conducting research on the health of populations and the quality, safety and efficiency of health care
- Evaluation of the suitability of EHR systems to support statistical uses can not wait – as decisions taken today may either facilitate or obstruct statistical uses
Progress report

• **Fact finding** exercise
  – Survey of 18* countries on the development of electronic health record systems and the specific aspects of the design that relate to the ability to extract high quality data from these records to monitor and report on health care quality

*Three additional countries have also responded and will be included in the next draft of this study.
Current use of electronic records in physician offices and hospitals

• An electronic medical record (EMR) or patient record (EPR) is a computerised medical record in an organisation that delivers care for its own patients

• All countries report at least some physicians and hospitals are using EMRs
  – Seven countries reported most primary care physicians and eight reported most specialist care physicians are using EMRs
  – Nine reported most hospitals are using EMRs
National plans for EHR systems

• 16 countries reported a national plan to implement electronic health record systems

• Just over half of countries have national plans that include secondary uses of EHR data for
  – Supporting physician data queries (13 countries)
  – Public health monitoring (11 countries)
  – Patient safety monitoring (11 countries)
  – Research to improve health and health care (11 countries)
  – Health system performance monitoring (10 countries)
  – Facilitating and contributing to clinical trials (9 countries)

• Countries with few current plans for secondary uses of data tend to report that priority needs to be first given to the EHR deployment and the development of standards
• 15 countries have implemented or have started implementing a national EHR system
  – 11 are aiming toward a system where a patients’ electronic record may be
    • Exchanged among physician offices and between physicians and hospitals treating the same patient
    • With information exchanged about
      – Current medications
      – Laboratory test results
      – Medical imaging results
  – 4 are restricting the scope to only some of these dimensions
• The U.S., Germany and the Netherlands are not implementing a national EHR system
Implementation of a national EHR systems varies:

- Implementing a single country-wide EHR system are: Austria, Finland, France, Indonesia, Japan, Singapore, Slovakia
- National EHR involves integrating EHR systems developed at the regional/state level: Belgium, Canada, Denmark, Poland, and Switzerland
- U.K. has a single EHR system for England and one for Scotland
- Republic of Korea has implemented an EHR within public health centres
- Four main health care institutions in Mexico are using EPRs. Interoperability platform was designed but is not yet implemented.
13 countries have a minimum data set as part of their National EHR plan. It is intended to support standardization and sharing of a core set of patient data.
Minimum data set implementations vary

- National minimum data set is required in most countries
- In the U.S., a set of data has been identified that must be used as part of a certified EHR system for providers to qualify for a financial incentive
- Canada recommends provinces and territories adopt standards for a minimum data set
Use of structured data with clinical terminology standards is quite common.

Number of countries reporting elements are structured (terminology standard):

- Diagnosis: All records
- Medications: All records
- Laboratory test results: All records
- Socio-economic information: All records
- Medical image results: All records
- Surgical procedures: All records
- Physical characteristics: All records
- Health behaviours: All records
- Psychosocial or cultural issues: All records

Legend:
- All records
- Some records
Variation in use of terminology standards

Some countries are adopting international terminology standards while others rely more on national coding systems

<table>
<thead>
<tr>
<th>International standard</th>
<th>Elements</th>
<th>Number of countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICD-10</td>
<td>Diagnosis</td>
<td>14</td>
</tr>
<tr>
<td><strong>DIACOM</strong></td>
<td><em>Medical images</em></td>
<td>10</td>
</tr>
<tr>
<td>LOINC</td>
<td>Lab tests</td>
<td>8</td>
</tr>
<tr>
<td>WHO ATC</td>
<td>Medications</td>
<td>8</td>
</tr>
<tr>
<td>SNOMED</td>
<td>Diagnosis</td>
<td>4</td>
</tr>
<tr>
<td>SNOMED</td>
<td>Surgical procedures</td>
<td>3</td>
</tr>
<tr>
<td>ICD-9</td>
<td>Surgical procedures</td>
<td>3</td>
</tr>
</tbody>
</table>
Just over half of countries have established unique identifying numbers for patients and health care providers.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients and Providers</td>
<td>11</td>
</tr>
<tr>
<td>Patients only</td>
<td>3</td>
</tr>
<tr>
<td>Neither</td>
<td>4</td>
</tr>
</tbody>
</table>

Smart cards for patients and/or providers emerging in 6 countries, and in plans for 3
Most countries report a national governing body has been given responsibility for the implementation of the National EHR plan and setting standards for clinical terminology and interoperability.

- Role is limited to recommending national standards in U.S. and Canada.
- No public body in the Netherlands, Germany and Mexico.
• France and Finland have legal requirements for providers to adopt EHRs and adhere to national standards for clinical terminology and interoperability.
• Poland and Slovakia are developing laws that are expected to require providers to adopt national standards.
• Switzerland is developing a law to limit EHR access to certified providers, but no requirements to adopt the EHR or to adhere to standards are anticipated.
• Some Canadian provinces have passed laws requiring pharmacy EHR systems to conform to national standards.
Encouraging EHR data quality

- 6 countries have a certification process to ensure EHR systems sold to providers conform to national standards.
- 8 countries have either financial incentives or penalties to encourage adoption of systems conforming to national EHR requirements.
- Most commonly reported were:
  - Financial incentives to implement and/or use EHR
  - Withdrawal of payments for non-compliance
  - Both
- Encouraging vendors to improve the “user-friendliness” of their systems.
Data quality concerns

Concerns with the quality of the data entered into EHRs are widespread (10 countries):

- Under coverage
- Clinician fatigue
- Invalid data
- Missing data
- Records not kept up-to-date
- Unusable data elements
- Up-coding to increase payments
- Variable quality across institutions
- Records go unchecked
- Quality dependent on user’s ability/interest

Some countries note audits of data for billing purposes but no countries are auditing clinical quality of EHRs
7 countries report building databases from EHRs for health care monitoring and research. Examples include:
- Finland – Primary care register and beginning to extract data from EHRs for a range of registries
- Korea – Laboratory tests, procedures, medications, injections, physical therapy, and diseases databases
- United Kingdom – Renal registry, cancer registry, diabetes register, primary care, research databases
- Canada – Primary care surveillance (voluntary reporting)

9 countries report having or planning to implement a process to evaluate the usability of databases built from EHRs
Challenges to database creation and data use

- Data privacy concerns
- Resources/skilled personnel to build and analyse databases
- Inconsistent terminology/interoperability problems
- Data quality
- Data de-identification/confidentiality protection
- Expensive to move away from current system of building databases
- Data sharing/ownership issues
- Lack of a unique patient identifier
- Lack of structured data
- Need for data governance
Third parties

- To help with the legal and technical complexity

<table>
<thead>
<tr>
<th>Country</th>
<th>3rd party to build databases and de-identify data</th>
<th>3rd party to very proposals to access data</th>
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</thead>
<tbody>
<tr>
<td>France</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Belgium</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>United Kingdom (England)</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Republic of Korea</td>
<td>Yes (insurance)</td>
<td>Yes (insurance)</td>
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<tr>
<td>Canada</td>
<td>Yes (planning)</td>
<td>No</td>
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<tr>
<td>United States</td>
<td>To be considered</td>
<td>To be considered</td>
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</table>
Vendor enabled databases and data privacy protection

- Many countries (9) indicated that vendors of EHR systems offer clients the ability to build databases and provide statistical tools to analyse the databases.
- A few countries identified controls to protect health information privacy
  - Finland has centralised database development and there is one manager responsible for each registry and this manager approves access to the data
  - The United Kingdom has established one governing body for all private and public sector projects involving analysis of personal health data not authorised by law and where patient consent not obtained
Views about the next 5 years

How likely is it your country will use any data from EHRs for national health care quality monitoring?

<table>
<thead>
<tr>
<th>Country</th>
<th>Very likely</th>
<th>Likely</th>
<th>Unsure</th>
<th>Unlikely</th>
<th>Very unlikely</th>
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<td>Finland</td>
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<td>Japan</td>
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<td>Denmark</td>
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<td>United States</td>
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<td>Mexico</td>
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<td>Switzerland</td>
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Barriers and challenges

Related to EHR implementation

- Reluctance of health care providers (6)
- Financial barriers (4)
- Legal barriers (3)
- Adoption of standards
- Data security concerns
- Lack of technical infrastructure
- Shortage of technical skills

Related to ability to analyse data from EHRs

- Need for legal provisions (3)
- Privacy concerns
- System not ready
- Unusable data elements
- Lack of structured data
- Time to build up providers trust
- Shortage of technical skills
- Financial barriers
- Data sharing problems
- Resources to change from existing database production methods
Next steps

• Monitor the deployment and use of EHRs as part of on-going monitoring of national information infrastructure

• Contribute toward the use of or the development of international consensus standards for EHR terminology

• Bring concerns about the interaction between legislative frameworks and statistical and research uses of EHRs to the table for joint discussion between HCQI and the WPISP
• HCQI members are invited to:
  – Comment on these first results
  – Discuss next steps to finalise this report and the report on the secondary uses of personal health data
  – Make recommendations for the continuation of this program of work