Gary Dickinson
Benefits of Interoperable Electronic Health Information – 22 Nov 2016

I. Characteristics of interoperable electronic health information

- A. Right information
  1. Accurate, authentic, unaltered, traceable to source
  2. Pertinent, relevant to purpose of use, actionable
  3. Including clinical context, with purpose of capture
  4. Including provenance: who, what, when, where, why
- B. Right place: at point of service, point of care
- C. Right time
- D. About the right person(s): patient(s), population(s)
- E. To the right person(s): provider(s), care team member(s)
- F. Right unit(s) of information corresponding to right unit of work or process
- G. Right standards applied to:
  1. Vocabulary/terminology
  2. Capture, origination
  3. Encoding: code/classification schemes
  4. Encryption: at rest, in motion
  5. Verification, attestation
  6. Record retention, management
  7. Content translation, transformation
  8. Exchange artifacts: e.g., HL7 messages, CDA/CCDA documents, FHIR resources
  9. Transmit, receipt
  10. Authorization, consent
  11. Authentication: human, device, software, data
  12. Access control
  13. Accountability
  14. Audit/traceability
  15. Provenance
  16. Physical, software and network security
- H. Right infrastructure to implement standards:
  1. Source → exchange → receiver
  2. Systems, apps, devices, mobile

II. Benefits of interoperable electronic health information

- A. Improved health information availability: allowing access anytime, anywhere
- B. Improved quality and safety of care
- C. Improved ability to coordinate care
  1. To support individual health, to provide healthcare
  2. Within care settings: small to large
  3. Across geographically separated care settings
  4. Simultaneously engaging geographically separated patients, providers, experts and consultants

D. Increased ability to provide care in place
    1. Reduced need to travel to receive care, often physically separate care settings
E. Increased efficiency, throughput, performance by leveraging
    1. Economies of scale
    2. Economies of care in place: e.g., via real-time messaging and video-conferencing
    3. Economies of enabling recognized "best practices" across populations, providers and settings
F. Reduced cost due to increased efficiencies
G. Improved operational efficiencies by integration of key flows
    1. Patient flow
    2. Work (process) flow
    3. Information flow
H. Increased accessibility
    1. All patient information logically (although not physically) in one place: PHRs, Health Record Banks
    2. Access to support routine care
    3. Access for critical, scarce and specialized services, providers
I. Improved situational awareness, immediacy of information and ability to respond
    1. Patient status and progress
    2. Healthcare operations in real-time: status, flow, performance, allocation, assignment, deployment, staff, facilities, equipment, supplies, time
J. Improved patient engagement
    1. Information sharing: patient and provider
    2. Facilitated by alerts, notifications, reminders
K. Improved support for reimbursement
    1. Charge capture
    2. Billing, claims, attachments
L. Improved support for public health
    1. Person and disease registries
    2. Notifications/alerts to providers and patients
    3. Forecasts: e.g., when vaccines are due
M. Improved support for clinical research
N. Improved support for statistical and economic analysis
O. Increased likelihood to meet end user/use expectations consistently and effectively
P. Increased likelihood that exchanged information:
    1. Is authentic
    2. Is consistent with (maintains fidelity to) its source
    3. Is immediate: current, timely

4. Is not superseded by more recent information
5. Can be distilled: from multiple sources
6. Is concise (not excessive)
7. Is digestible, readily understood (assimilated, comprehended, grasped)
8. Is fit for use/purpose: can be used with confidence
9. Is targeted, readily applied to purpose of use
10. Is readily incorporated: in process/work flow, in target health record

Q. Reduced risk, liability to providers
1. Based on open standards
2. Shows evidence of who did what when where and why
3. Shows facts, findings, observations
4. Shows decisions and rationale (substantiation)

R. Reduced market risk to developers
1. Based on open standards
2. Opens new product opportunities: e.g., software modules extending existing platforms, agile development outpacing aging monoliths

S. Improved access to the health/healthcare market
1. Promotes new entrants: new developers, new products

T. If based on (and certified to) open standards for functionality/input/output:
1. Increased substitutability of software modules
2. Reduced cost of acquisition (due to market competition)

U. Reduced leverage (dominance) of large (monopolistic?) software developers/vendors

V. If bi-directional:
1. Increased ability for true interoperation of software modules

W. Reduced likelihood of failure (outages)
1. Improved redundancy, ability to switch/substitute software modules in real-time, covering single or multi-point failure scenarios
2. More rapid recovery/restoration from failure scenarios

X. Reduced cost of operations and maintenance:
1. Allows substitution of more efficient and/or robust modules; modules requiring less manual intervention
2. Improved selection, choice

Y. Improved potential for cloud computing and storage
1. Off-site
2. Relying on multiple redundant copies

Z. Improved system resistance to attack