A Qualitative Analysis of Electronic Medical Records in Correctional Healthcare Settings

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Introduction -
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In order to alleviate the challenging complexity of paper medical records, electronic medical records may provide a good and viable solution
Correctional Facilities

- Required to provide quality healthcare to inmates
- Inmates have a guaranteed right to healthcare
- Medical records must be very mobile
Problem Statement

- Will the utilization of electronic medical records in correctional healthcare settings provide a cost savings to the North Carolina Department of Correction?
Study Guidelines

- Analyze the current usage, barriers, and benefits
- Mixed method research study
The United States healthcare industry may be the world’s largest inefficient information system.

Most medical records are still stored on paper.

Many patients do not transfer their medical records between healthcare providers.

According to the Institute of Medicine (2001), “health care delivery has been relatively untouched by the revolution in information technology that has been transforming nearly every other aspect of society” (p.15).

In an article by Hillestad et al. (2005), the authors state that it was widely thought that adoption of electronic medical records would lead to major health care savings, reduce medical errors, and improve health; however, these benefits have not been realized.
Since 2001, efforts have been made to increase information technology use, but the usage has increased only slightly.

Despite efforts, only about 31% of hospital emergency departments and 29% of hospital outpatient departments use EMR’s.

Even less usage in correctional healthcare settings.
The use of electronic systems is much more advanced in Britain, New Zealand, and Australia.

Primary care physicians' use of electronic medical records:
- 17% in the United States
- 25% in Australia
- 52% in New Zealand
- 59% in Great Britain

Physicians who utilized electronic prescriptions:
- 9% in the United States
- 42% in Australia
- 52% in New Zealand
- 87% in Great Britain
United States and Information Technology

In the 1990’s, many industries invested heavily in information technology:
- telecommunications and securities trading
- retail and general merchandising
- consumers realized this investment with:
  - bar coded retail checkouts
  - automated teller machines
  - consumer reservation systems
  - online shopping and brokerage services

These industries have grown 6-8%
Healthcare Savings?

While healthcare is much different than those with a technological advantage, the utilization of technology in the healthcare field should lead to a decrease in healthcare spending and any decrease in correctional healthcare spending would be a savings to the State.
In 2004, President George W. Bush promised his administration would work towards equipping most Americans with electronic medical records in ten years.

What about correctional healthcare inmates?

Many government, technological issues, and policies will have to be overcome.
Electronic Medical Records Savings

- As much as $77 billion a year; primarily in hospital lengths of stay, nurses’ administrative time, drug usage in hospitals, and drug and radiology usage in and outpatient settings could be saved.
- These areas are major components and expenses of inmate healthcare.
- Savings would vary for each corrections’ department; however, savings in millions of dollars could easily be experienced - if all correctional departments and hospitals utilized by corrections implemented an electronic medical records system.
Electronic Medical Records

- EMRs could improve many of the problems with paper medical records. EMRs can be transportable, transferable, complete, automated, standardized, and typed, along with being connected to clinical pathways and other tools, which could reduce medical errors while increasing communication and coordination of care.
Little research has addressed electronic medical records in correctional healthcare.

Comparable data and literature was reviewed with the Veterans’ Administration Electronic Medical Records system and those correctional states that have published literature information.
Legal Background

- Led to the guaranteed right for inmate healthcare
Inmates Mobility

- Large numbers of inmates moving in and out of jails and prisons is impossible to track with paper.
- Many inmates have multiple medical paper charts because of aliases, unorganized chart storage, or the inability to locate the charts because of the sheer number of volumes.
Correctional Healthcare Savings

Electronic medical record systems’ productivity can save medical facilities, including correctional prisons, millions of dollars every year in administrative costs, while also shortening inmate encounter time, increasing the quality of care, and providing better healthcare options for inmates.
Correctional States with Electronic Medical Records

- Seven states responded and have some form of correctional electronic records, four have published literature information in peer reviewed journals:
  - Colorado
  - Texas
  - Iowa
  - Kentucky
Original intent of the study was to analyze eight northeastern states. Of the eight healthcare directors or respondents that returned results, only two states (Connecticut and New Jersey) were found with at least a partial implementation of electronic medical records in their correctional healthcare system.
Since the original goal of this study did not obtain valuable comparative data, seven southwestern states were contacted.

Of these seven additional states contacted, five states returned survey results, and two states (Colorado and Kansas) were found to have implemented electronic medical records in their correctional healthcare system.
Since four of thirteen states with some form of electronic medical records in their correctional healthcare system was at best minimally sufficient for an analysis, it was determined that all remaining states would be contacted.
State Correctional Healthcare Electronic Medical Records

<table>
<thead>
<tr>
<th>Status, 2007</th>
<th>Number of States (0-25)</th>
</tr>
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<tbody>
<tr>
<td>YES</td>
<td>7</td>
</tr>
<tr>
<td>NO</td>
<td>20</td>
</tr>
<tr>
<td>NO Inmate Mgmt System</td>
<td>1</td>
</tr>
<tr>
<td>Planning - Implementation (2009)</td>
<td>1</td>
</tr>
<tr>
<td>Considering - Working w/vendor</td>
<td>1</td>
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<tr>
<td>Considering - Vendor Selection underway</td>
<td>1</td>
</tr>
<tr>
<td>Considering - Reviewing</td>
<td>2</td>
</tr>
<tr>
<td>Considering - RFP</td>
<td>2</td>
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</table>
Only seven states have a form of electronic medical records in their correctional healthcare.

Twenty states do not utilize electronic medical records at the time of this survey.

One state has a limited electronic medical system in the form of an Inmate Management System.

One state is planning implementation in 2009.

One state is planning implementation and working with a vendor.

One state is planning implementation and is in the process of selecting a vendor.

Two states are considering implementation with requests for proposals outstanding.

Two additional states are considering implementation by reviewing systems and processes.
Since only seven states had some form of electronic medical records, a second survey was targeted at those correctional states that have implemented electronic medical records and an equal number of states with similar inmate populations that have not implemented electronic medical record systems to determine a correlation between implementation concerns, such as cost, training, obstacles, and most importantly barriers towards implementation.
Research Question 2:

- Whose system is utilized and what was the year of implementation?
  - Seven states have electronic medical records
    - two were created internally
    - one was created by a medical contractor
    - Systems have been purchased or leased by Centricity (GE), Business Computer Applications, and Medunison
    - One state utilizes a Siemen’s Patient Safety (Envision) Hospital system, through the University of Connecticut Healthcare System.

Whether a system is purchased/leased or created internally, the system should be designed by individuals who have an understanding of healthcare records.
Research Question 5

- What healthcare records are maintained in the electronic medical records system?
  - Colorado: Most health information
  - Kansas: All health records, except signed consents and Do Not Resuscitate orders.
  - Kentucky and Missouri: All healthcare records, except outside consultations.
  - New Jersey: Notes, labs, x-ray reports, consultative reports; no graphics.
  - Texas: All patient healthcare records are supported through the electronic medical records. Texas has been paperless in their facilities since 2002.
Research Question 6

- Does the electronic medical records system include other clinical health information, such as computerized physician order entry, electronic RX, or other components?
  - Colorado: A portion of the labs results are tied in from a vendor’s system.
  - Connecticut: Drug ordering, lab results, and radiology results
  - Kansas: The NextGen medical application, which is the vendor application utilized, includes other clinical information.
  - Kentucky: Orders, vitals, prescriptions, labs, history, and chronic care information.
  - Missouri: All clinical health information
  - New Jersey: No electronic medical administration records or physician prescription ordering is entered
  - Texas: The electronic medical records handles all aspects of the patient’s healthcare records, including provider order entry, laboratory, x-ray, electronic charts, medications, and diagnosis.
Research Question 7a

Has your organization noticed a cost saving by going paperless?

Cost Savings

- Yes: 2
- No Response: 3
- Unknown: 2
Research Question 7b

Have you gone totally paperless?
Research Question 8

- Has your State healthcare expenses noticed a cost saving by going paperless?
  - Three states – yes
  - Two states – no
  - Two remaining states - n/a
Research questions nine through twelve were geared to implementation cost, budgetary approval, and maintenance cost annually. Minimal data was collected:

- Kansas: $2 million to implement the electronic medical record system, including information technology staff, licensees, and hardware for the first five years and $2 million in the last three years for upgrades by a new vendor. This cost is part of the medical contractor fee.
- Kentucky: $700,000 to implement their electronic medical records system; annual maintenance cost - $350,000.
Research Question 13

- Approximately how much is saved annually at your facility?
  - Colorado, Connecticut, Kentucky, and Kansas did not provide any data or stated no cost studies have been done.
  - New Jersey stated there had been no savings as a result of the electronic medical record system.
  - Missouri stated there had been no savings, just less time filing and more time typing.
  - Texas stated that the electronic medical record system is in all facilities. They have had an electronic medical record system for more than seven years; therefore, they no longer keep cost justification data. Nevertheless, the original savings were significant, but the system might not be comparable in another state as the providers have over twelve million dollars in annual salary expenses associated with medical records staff.
Research Question 15

Do all inmates have an electronic medical record in your system?

![Bar Chart]

- **Inmates who have an EMR**
- **Y-axis**: Number
- **X-axis**: Response
- **Yes**: 7
- **No**: 0
Does the electronic medical record system contain the entire inmate medical history or just care that is given at your facility?
Research Question 17

What happens to the inmate electronic medical record once the inmate is released or transferred to another facility?
Research Question 18

What is the approximate size of your inmate population?

The responses provide further support that each state has its own unique inmate demographic.
- Connecticut: 18,000
- Colorado: 23,000
- Missouri: 30,000
- Kansas: 9,200
- Kentucky: 13,000
- New Jersey: 27,000 inmates.
- Texas: 150,000 (with a total of over 2 million inmate records)
Research Question 19

- What is the average inmate sentence at your facility?
  - The average inmate sentence for two of the three that responded, Kansas and Kentucky, was approximately three years.
  - The average inmate sentence for the third that responded, Texas, was approximately nineteen and a half years.
Research Question 20

Research question twenty inquired about the average inmate age. The average inmate age for the three states that responded was 36 years of age.
Research Question 22

How many correctional facilities are in your State?

These responses also provide further support that each state has its own unique inmate demographic.

- Connecticut: 18 facilities.
- Colorado: 23 state facilities and 6 private facilities.
- Missouri: 21 locations.
- Kansas: 8 locations and 45 clinics.
- Kentucky: 16 facilities.
- New Jersey: 14 facilities.
- Texas: 111 facilities and leases beds from an additional 4 facilities.
Research Question 23

What is the approximate size of your correctional healthcare staff at your facility?

- Connecticut, Colorado, and Missouri did not respond.
- Kansas: 390 users of the EMR system.
- Kentucky: 275 staff members statewide.
- New Jersey: 40 staff members for management; health services at the facilities are privatized.
- The two universities from which the Texas Department of Criminal Justice contracts healthcare staff have over 4000 employees assigned to Texas facilities.
Research Question 26

- Has inmate quality of care changed?
  - Connecticut: gone up.
  - Kansas: they passed all National Commission on Correctional Health Care audits; also, they can track for follow-up care and contract compliance for the medical services which are being given as needed or contracted.
  - Kentucky: improved disease management.
  - Missouri: inmate quality of care has not changed; however, it is easier for review past treatments.
  - New Jersey: unable to determine (no method to compare before or after electronic medical record implementation)
  - Texas: yes, with the electronic medical records system all providers have simultaneous access to medical record information at the same time; thus, access to care has increased.
Research Question 27

Are there other advantages or disadvantages with an electronic medical records system that may be relevant to this research project that you are willing to share?

- Connecticut: provided better care for the inmates.
- Kansas: telemedicine in Mental Health Services has provided access to care and cost savings.
- Kentucky: greater access to information.
- Missouri: electronic medical records are easier to read and reduce errors, especially for medication orders.
- New Jersey: many advantages in clinical practices in correctional medicine and public health in the facilities.
- Texas: significantly reduced the cost and time involved in transporting inmates, as they have telemedicine technology in every state prison location. This has significantly reduced the need for security personnel and the risk to the public in transportation. It also improves patient care as they see inmates via telemedicine with many primary care and specialty care electronic visits. They conduct approximately fifty thousand telemedicine visits annually, and they significantly reduce the cost and time in sending inmates to local or state prison hospitals.
Research Questions 28 - 33

(N=5)

- Question (28): Have you reduced the number of health care staff?
  YES 1
  NO 4

- Question (29): Have you reduced the number of onsite physician visits?
  YES 1
  NO 4

- Question (30): Have you reduced the number of off-site physician visits?
  YES 3
  NO 2

- Question (31): Have you reduced the number of electronic medical record encounters?
  YES 0
  NO 5

- Question (32): Have you reduced the number of medical transfers?
  YES 3
  NO 2

- Question (33): Have you increased or decreased healthcare spending?
  INCREASED 1
  DECREASED 2
  NEITHER 2
Research Question 34

What items have been your biggest increases in healthcare spending?

- Salaries
- Medications
- Hospitalizations.

(These increases may be attributed to offenders entering the system with less healthy status and receiving longer prison sentences)
Follow-up Survey

- Targeted the seven states that had implemented electronic medical records in their correctional facilities and an equal number of states that had not implemented electronic medical records (N=6: Colorado, Kansas, Kentucky, Missouri, New Jersey, Texas plus Connecticut).
- The states without electronic medical records were chosen due to their similarity in inmate population to a state that had implemented electronic medical records (N=6: Alaska, Arizona, Georgia, Minnesota, Oklahoma, Rhode Island plus Vermont).
Research Question 1

What was the main reason your state adopted electronic medical records or what is the reason(s) your state has not adopted electronic medical records?

- With EMR: Cost savings, improved patient care, telemedicine, continuity of care, legibility, storage, and electronic sharing of treatment plans.
- Without EMR: Budgetary. One additional reason, proposal outstanding, was provided by two additional states that have a request for proposal being considered by vendors.
Research Question 2

- What obstacles had or will have to be overcome with your state and the budget to implement electronic medical records?
  - With EMR: ranged from no obstacles to showing ramifications of lost charts, data lost, and having to look for missing charts. Other barriers included budgetary, staff inability to type, and connectivity and hardware capabilities for dispersed, sometimes rural, geographic locations.
  - Without EMR: Funding and approval, convincing legislators and the administration of the need, and purchasing an electronic medical records system.
Research Question 3, with EMR

- What obstacles had to be overcome and what training had to be provided to staff to implement electronic medical records?
  - Implementation throughout a large state, development of a policy with a definite start date, and creation of assistants who could assist with issues.
  - A main barrier, which is similarly found in all types of implementations, was training.
Research Question 3, w/o EMR

- Are you considering planning, reviewing, or implementation within the next five years?
  - This question brought an equal response with two states considering reviewing in the next five year; two states considering planning, reviewing, and implementation in the next five years; and two states considering purchasing a system in the next five years.
What stages do you hope to complete in the next five years?

While the stages vary for each state, two hope to at least complete the planning phase and two additional states hope to complete the planning, review, and implementation stages. One state hopes to at least develop an in-house computer record system to monitor reminders and immunization, and the last state hopes to obtain approval, select a beta site and begin implementation throughout their state.
Research Question 4, with EMR

- What have you gained by implementation of electronic medical records?
  - The responses to this question brought the greatest distinctions; however, several major themes were still common.
    - Improved continuity of care and patient safety
    - The ability to develop many administrative and audit reports to monitor compliance,
    - Reduction in medical and patient treatment errors.
    - The most common theme was the accuracy that an electronic medical records system brings to the table, including never losing a chart and the ability to monitor healthcare from any location in the state.
Research Question 5, with EMR

- What pitfalls are associated with the implementation of electronic medical records?
  - Staff with little or no computer skills showing reduced productivity
  - Issues such as connectivity, installation, and maintenance of the electronic system.
  - There were also issues related to getting staff and management to buy into a new system and development of a standard operating procedure for utilization of the electronic medical record system.
  - Some issues related to the system were that workers are dependent on technology; therefore, the system must be constantly evaluated and changes made to stay current with necessary updates.
  - Final issues relate to not underestimating build time and to ensure that training is included in the initial phase as well as throughout the utilization of electronic medical records.
Will a cost/benefit analysis be conducted before implementation and will it be utilized to sell your administration and/or state budget committees?

- For those states considering an electronic medical records system, two states stated they would put together an analysis, one state said they might put together an analysis, and a fourth state was not sure whether an analysis would be conducted.
- One state mentioned a draft analysis had been completed but not presented to administration.
- One state said a cost benefit analysis was completed, with the analysis recommending an electronic medical records system.
Was a cost/benefit analysis conducted before and/or after implementation and what has been discovered with this analysis?

- Only two of the six states conducted an analysis before and after implementation.
- The analysis conducted after implementation revealed several matters that should be addressed.
  - replacement of the servers at least annually
  - replacement of a portion of the personal computers annually so that each computer is replaced every three to four years.
  - consideration should be given to other components of an electronic medical records system, such as medication and pharmacy administration.
- The after implementation analysis for one state showed the break even point was around year nine.
- An analysis for another state showed the cost of patient day was lowered from about eighteen dollars a day to only about seven dollars and fifty cents a day.
Research Question 6, w/o EMR

- What are your primary disadvantages of your paper record system?
  - Lack of portability
  - Lack of legibility
  - Increased likelihood of errors
  - Lack of consistency
  - Problems with storage of both active and inactive cases
  - Efficiency in health care that leads to greater healthcare costs.
What are your primary disadvantages of implementation of electronic medical records?

- None
- Initial development by a computer programmer who did not understand healthcare needs
- Those who did not know how to type
- Dual systems through the implementation and developmental process leading to interface problems
- Notes are canned, and therefore a lot of novel information is lost
- Physicians have a tendency to rely too heavily on the computer and not treat the patient, losing eye and other contact with the patient
- Training - Training has to be constant and continuous to ensure everyone has a knowledgeable understanding of the electronic medical records system.
Research Question 7, w/o EMR

What are your primary advantages of your paper record system
- None
- No down time with paper
- Staff comfort doing things the old way
Question 8 with EMR

What are your primary advantages/benefits of implementation of electronic medical records?

- Ability to read all records and notes
- Time and Cost savings.
- Consultations with other physicians in real time, such as in the case of telemedicine.
- Immediate access to information, including instant monitoring of inmate care and audit oversight.
- Electronic medical record systems can provide a decreased duplication of tests and more efficient delivery of healthcare services.
- Management is also able to provide statistical trends and graphs that can be easily reviewed.
- Inmate records are available anywhere the inmate is located, since inmates are very mobile or may have to be moved quickly in a transfer or disaster situation.
Research Question 8, w/o EMR and Question 9 with EMR

- Are there other issues, either good or bad, that you have learned about your paper system or electronic medical record systems that would be valuable to share with others?
  - Time spent researching and planning will pay off ten fold in the future. There are too many cases of electronic medical record failures or not a complete success due to lack of preliminary planning and understanding the needs and functionality of your organization before moving forward.
  - Difficult to monitor chronic care patients
  - Intra-agency transfers are not always added to the paper list, so patients with hypertension, high blood pressure, or asthma are not seen on a regular basis.
  - Ensuring staff that utilize the system have input into the development of the system
  - Implementation will take the entire team from administration to healthcare users.
  - Processes should be standardized and leadership should mandate all users follow the standard process.
  - Training
Vermont has a partial electronic medical records system. The system is called a Catalyst program and was developed internally by Prison Health Services and is specific to intake screenings, appointments, histories, and physicals. It is not a complete electronic medical record system; however, newer and improved versions are being planned on the horizon. Before implementation of the Catalyst program, a cost benefit analysis was not conducted; however, the program has provided a cost savings because it is a more effective and efficient way of delivering health care.
One additional state with EMR

- One additional state, Connecticut has an electronic medical records system; however, this system is hospital based. The specialty care is done at the University Medical Center in Connecticut. The electronic medical records are closely integrated with the hospital system. The hospital system is a Siemen’s Patient Safety (Envision) Hospital system, but is not a complete electronic medical records system. The goal of the electronic medical records system is to manage workflow and information.

- All Connecticut inmates are registered as hospital patients in the electronic medical records system.

- According to Dr. Mark Buchanan, with the University of Connecticut Hospital System electronic medical records implementation team, The Siemen’s Patient Safety System is not good for clinical notes, and the system is very expensive to modify. The majority of additional programs added are custom programs designed to wrap around the current database. Even with the electronic medical records system, each facility and the University Hospital still maintain paper records.
Important Findings

- Two states really emerged as the leaders in correctional electronic medical records – Kansas and Texas.
  - The Kansas correctional electronic medical record system was the first correctional electronic system in the nation. The electronic medical records system created by NextGen for utilization in Kansas is also now utilized by the state of New Jersey.
  - The Texas correctional electronic medical records system is the largest in the nation. There are 125 facilities in a large state that had to deal with a lack of adequate telephone service and work through connectivity issues during implementation. Connectivity and telephone play and important part in any correctional electronic medical records system as a number of facilities are usually built in rural, sparsely populated areas.
- In the states that have implemented correctional electronic medical records, the more inmates in the system, the more apparent savings to the State. With a larger inmate population, the system developmental cost is incorporated into a larger population, allowing a greater savings potential per inmate.
While each state that had correctional electronic medical records provided valuable input, a model correctional electronic record system comes primarily from the Kansas, New Jersey, and Texas electronic medical record systems.

This model system is by no means all inclusive, and no technical information has been included in this summary.

The design of an electronic medical record system should include all aspects of an electronic medical record, including scheduling, patient identifiers (such as immunization, allergies, high blood pressure, hypertension, etc.), and the ability to track procedures, diagnoses, and prescriptions.

The electronic medical record system should also have the ability to tie in with laboratory, x-ray, and pharmaceutical applications.

A state of the art system should also include components such as telemedicine and telepsychiatry.

The system should be web based,

Have the capability of producing algorithms,

And possibly one of the most important aspects is to allow a person to do real time communication through electronic mail and/or sharing of PDF files.
Results

The current usage of electronic medical records in correctional settings is still in its infancy, as only seven states have implemented a form of an electronic medical record. Most of these states have implemented their system in the last five years; therefore, expansion to additional states in the next five years seems likely.
Results

Implementation of an electronic medical records system can lead to:

- Cost savings – at some point, in a particular year, a break even point will probably be found.
- Improved patient safety
- Continuity of care
- Legible notes and healthcare records
- Telemedicine
- Interfaces with laboratory & pharmaceutical
Results

- Budgetary barriers had to be overcome by showing the ramifications of misplaced, lost, or none existent charts.
- Each state is unique - connectivity and hardware issues may be an issue as both rural and urban areas may have to be wired.
- Training must occur initially and continuously.
Results

Other pitfalls:

- Getting management and staff to understand the value of a new system and develop standards for the utilization of the electronic system.
- Management must understand the time and investment necessary to get a technologically advanced system and not put pressure to buy a quick system, since maintenance and continuous updates will become an integral part of the system.
Results

Advantages:
- Immediate ability to read, understand, and manage the patient records.
- Consultations can be done with physicians in the next room, the building next door, or several hundred miles away through the utilization of telemedicine.
- Decrease in unnecessary or duplicate tests.
- Management may monitor care and provide statistical trends, graphs, or analyze data.
- An electronic medical record lives on a server and is available instantly wherever the inmate presents for care. Therefore, there is no waiting for a paper chart, and medicine administration can begin instantly.
Results

Disadvantages:

● Some staff may have to learn to utilize a computer

● It may become necessary to expand notes for clarity, as long as staff and physicians treat the inmate and not the computer
Results

The primary benefit of an electronic medical records system is cost savings. There is:

- immediate access to information, both clinical and documentary
- care can be constantly monitored, reviewed, and documented.
- Correctional healthcare should utilize technology available in the twenty first century to deliver state of the art care to their inmates.
Interest in Research

- Pennsylvania Department of Corrections, Bureau of Health Care Services
- New York State Department of Correctional Services
- Ohio Department of Rehabilitation and Correction, Bureau of Medical Services
- Texas Department of Criminal Justice
Based on the research presented, the utilization of electronic medical records in correctional healthcare settings in North Carolina, or any state, can provide a cost savings in regards to healthcare delivery.
Conclusion

If healthcare is going to keep cost down, an electronic medical records system in correctional healthcare setting will be a necessity.

Hillestad

Kazley & Ozcan, 2008;

G. F. Anderson, Frogner, Johns, & Reinhardt, 2006;

Burt & Hing, 2005;


Poon et al., 2006

Taylor and Leitman, 2001

Fonkych & Taylor, 2005

Gater, 2006