Final Progress Report for Research Projects Funded by Health Research Grants

Instructions: Please complete all of the items as instructed. Do not delete instructions. Do not leave any items blank; responses must be provided for all items. If your response to an item is "None", please specify "None" as your response. "Not applicable" is not an acceptable response for any of the items. There is no limit to the length of your response to any question. Responses should be single-spaced, no smaller than 12-point type. The report **must be completed using MS Word**. Submitted reports must be Word documents; they should not be converted to pdf format. Questions? Contact Health Research Program staff at 717-783-2548.

1. **Grantee Institution: Geisinger Clinic**

2. **Reporting Period (start and end date of grant award period): 1/1/2011-6/30/2012**

3. **Grant Contact Person (First Name, M.I., Last Name, Degrees): Samantha N. Fetterolf, BS**

4. **Grant Contact Person's Telephone Number: 570-214-5230**

5. **Grant SAP Number: 4100054849**

6. **Project Number and Title of Research Project: Project 2:*The Natural History and Comparative Effectiveness of Electronic Alerts in Geisinger Health System's Electronic Health Record***

7. **Start and End Date of Research Project: 1/1/2011-6/30/2012**

8. **Name of Principal Investigator for the Research Project: Walter F. Stewart**

9. **Research Project Expenses**.

   9(A) Please provide the amount of health research grant funds spent on this project for the entire duration of the grant, including any interest earned that was spent:

   $ 40,012.27

   9(B) Provide the last names (include first initial if multiple individuals with the same last name are listed) of **all** persons who worked on this research project and were supported with health research funds. Include position titles (Principal Investigator, Graduate Assistant, Post-doctoral Fellow, etc.), percent of effort on project and total health research funds expended for the position. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name	Position Title	% of Effort on Project	Cost
Jones	Research Investigator	0.2%	307.40
Lerch	Research Development Manager	13.1%	7,871.93
Barua	Data Analyst	1.3%	1,123.86
Search	Project Coordinator	4.2%	2,160
Lewis	Data Analyst	1.9%	4,948.07

9(C) Provide the names of **all** persons who worked on this research project, but who *were not* supported with health research funds. Include position titles (Research Assistant, Administrative Assistant, etc.) and percent of effort on project. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name	Position Title	% of Effort on Project
None		

9(D) Provide a list of **all** scientific equipment purchased as part of this research grant, a short description of the value (benefit) derived by the institution from this equipment, and the cost of the equipment.

Type of Scientific Equipment	Value Derived	Cost
None		

10. Co-funding of Research Project during Health Research Grant Award Period. Did this research project receive funding from any other source during the project period when it was supported by the health research grant?

Yes_____ No_____ x _____

If yes, please indicate the source and amount of other funds:

11. Leveraging of Additional Funds

11(A) As a result of the health research funds provided for this research project, were you able to apply for and/or obtain funding from other sources to continue or expand the research?

Yes_____ No_____ x _____

If yes, please list the applications submitted (column A), the funding agency (National Institutes of Health—NIH, or other source in column B), the month and year when the application was submitted (column C), and the amount of funds requested (column D). If you have received a notice that the grant will be funded, please indicate the amount of funds to be awarded (column E). If the grant was not funded, insert "not funded" in column E.

Do not include funding from your own institution or from CURE (tobacco settlement funds). Do not include grants submitted prior to the start date of the grant as shown in Question 2. If you list grants submitted within 1-6 months of the start date of this grant, add a statement below the table indicating how the data/results from this project were used to secure that grant.

A. Title of research project on grant application	B. Funding agency (check those that apply)	C. Month and Year Submitted	D. Amount of funds requested:	E. Amount of funds to be awarded:
	☐NIH ☐ Other federal (specify:_____ _____) ☐ Nonfederal source (specify: _____)		$	$
	☐NIH ☐ Other federal (specify:_____ _____) ☐ Nonfederal source (specify: _____)		$	$

11(B) Are you planning to apply for additional funding in the future to continue or expand the research?

Yes____ x _____ No_____

If yes, please describe your plans:

We plan to seek internal and/or industry funding to continue to refine the definition of "alert effectiveness" and utilize the extensive alert database that has been constructed as a result of this project.

12. Future of Research Project. What are the future plans for this research project?

We will continue to develop a more robust definition of alert effectiveness. We also plan to examine how alerts were impacted by other factors at the clinic, provider and patient level (e.g., time of day, day of week, total number of active alerts, provider patient panel size, patient comorbidities, etc.).

13. New Investigator Training and Development. Did students participate in project supported internships or graduate or post-graduate training for at least one semester or one summer?

Yes_____ No___x_____

If yes, how many students? Please specify in the tables below:

	Undergraduate	Masters	Pre-doc	Post-doc
Male				
Female				
Unknown				
Total				

	Undergraduate	Masters	Pre-doc	Post-doc
Hispanic				
Non-Hispanic				
Unknown				
Total				

	Undergraduate	Masters	Pre-doc	Post-doc
White				
Black				
Asian				
Other				
Unknown				
Total				

14. Recruitment of Out-of–State Researchers. Did you bring researchers into Pennsylvania to carry out this research project?

Yes_____ No___x_____

If yes, please list the name and degree of each researcher and his/her previous affiliation:

15. Impact on Research Capacity and Quality. Did the health research project enhance the quality and/or capacity of research at your institution?

Yes____x____ No_____

If yes, describe how improvements in infrastructure, the addition of new investigators, and other resources have led to more and better research.

The dataset that was constructed as a result of this project is a unique asset. Geisinger is one of few health organizations with a robust electronic health record dating back more than ten years. The ability to construct a natural history of alert effectiveness is a unique asset to Geisinger, and will be a continued resource for future research. As national policy (e.g., Meaningful Use) continues to incent the adoption of electronic health records, we expect to be able to address important questions about how health information technology can be used to improve care quality and the delivery of evidence-based care.

16. Collaboration, business and community involvement.

16(A) Did the health research funds lead to collaboration with research partners outside of your institution (e.g., entire university, entire hospital system)?

Yes_____ No___x_____

If yes, please describe the collaborations:

16(B) Did the research project result in commercial development of any research products?

Yes_____ No____x_____

If yes, please describe commercial development activities that resulted from the research project:

16(C) Did the research lead to new involvement with the community?

Yes_____ No_____x_____

If yes, please describe involvement with community groups that resulted from the research project:

17. Progress in Achieving Research Goals, Objectives and Aims.

List the project goals, objectives and specific aims (as contained in the grant application's strategic plan). Summarize the progress made in achieving these goals, objectives and aims for the period that the project was funded (i.e., from project start date through end date). Indicate whether or not each goal/objective/aim was achieved; if something was not achieved, note the reasons why. Describe the methods used. If changes were made to the research goals/objectives/aims, methods, design or timeline since the original grant application was submitted, please describe the changes. Provide detailed results of the project. Include evidence of the data that was generated and analyzed, and provide tables, graphs, and figures of the data. List published abstracts, poster presentations and scientific meeting presentations at the end of the summary of progress; peer-reviewed publications should be listed under item 20.

This response should be a DETAILED report of the methods and findings. It is not sufficient to state that the work was completed. Insufficient information may result in an unfavorable performance review, which may jeopardize future funding. If research findings are pending publication you must still include enough detail for the expert peer reviewers to evaluate the progress during the course of the project.

Health research grants funded under the Tobacco Settlement Act will be evaluated via a performance review by an expert panel of researchers and clinicians who will assess project work using this Final Progress Report, all project Annual Reports and the project's strategic plan. After the final performance review of each project is complete, approximately 12-16 months after the end of the grant, this Final Progress Report, as well as the Final Performance Review Report containing the comments of the expert review panel, and the grantee's written response to the Final Performance Review Report, will be posted on the CURE Web site.

There is no limit to the length of your response. Responses must be single-spaced below, no smaller than 12-point type. If you cut and paste text from a publication, be sure symbols print properly, e.g., the Greek symbol for alpha (α) and beta (ß) should not print as boxes (□) and include the appropriate citation(s). DO NOT DELETE THESE INSTRUCTIONS.

Project Overview

Electronic alerts can be used to prompt preventive care processes, to inform physicians of evidence-based treatment options at the time of ordering, and to prompt a diversity of other actions that require physician decision-making at the point of care. Given the proliferation of electronic health records (EHRs) in clinical practice, effective alerts have the potential to significantly improve health care quality and safety and to lower medical care costs. However, while it is technically straightforward to trigger an alert during a clinical encounter, this does not ensure that such alerts will be utilized as intended at the point of care. Moreover, there is evidence that "alert fatigue" can result from too many low-value alerts being triggered, minimizing the impact of all alerts. For example, it is estimated that millions of alerts fire within the Geisinger Health System's EHR each year, yet preliminary evidence suggests that only a portion of such alerts are opened and acted upon by providers.

Expected Research Outcomes and Benefits

The main objective of this project was to identify the various types of alerts that have been deployed in clinical practice, describe the frequency with which they are used, and characterize their effectiveness in achieving the desired clinical outcome. The results of this study will be helpful in rapidly advancing our understanding of what forms of alerts do and do not work, with the ultimate goal of translating this knowledge into forms of decision support that lead to improvements in meaningful outcomes (safety, quality, etc.). The first aim of this project was to establish a comprehensive database that will enable the quantitative and qualitative analysis of the effectiveness of EHR alerts. Aims two and three were to characterize the "natural history" of alerts and alerting protocols implemented in the Geisinger EHR., as well as to identify characteristics (e.g., physician, technical, clinical) associated with effective (i.e., lead to the intended behavior on the part of the provider) alerts.

Little is known regarding the effectiveness of various forms of electronic health record (EHR)-based alerts used in clinical practice, and research is lacking with respect to evidence supporting the specific forms and types of alerts that are successful (i.e., result in a provider taking a suggested action). There are very few institutions in the country that have as extensive a history of EHR-based alert use as does Geisinger. As such, the primary goal of this project is to mine the underlying data that characterize Geisinger's experience implementing alerts. We expect to generate evidence that will guide the development of future alerting protocols and decision support rules that can be adopted at both Geisinger and at other institutions that have or will adopt EHRs. This evidence is critical in this era of "meaningful use" of electronic health records, in which it is imperative to increase health care quality and safety and to concomitantly hold steady or decrease medical expenses.

Summary of Research Completed

This project had three aims. The first aim of this project was to establish a comprehensive database that will enable the quantitative and qualitative analysis of the effectiveness of EHR alerts. Aims two and three were to characterize the "natural history" of alerts and alerting protocols implemented in the Geisinger EHR., as well as to identify characteristics (e.g., physician, technical, clinical) associated with effective (i.e., lead to the intended behavior on the part of the provider) alerts. To date, aims one through three have been completed.

Aim 1:
Alert triggers are typically based on clinical status (e.g. out-of-range lab value), safety (e.g., drug-drug interactions), or quality (e.g., eligible for screening) criteria. After an alert is fired for a specific patient, there is a corresponding set of actions (e.g., order a lab) that the provider can take to close the alert. If the conditions are not met, alerts can be set to refire until the intended action is taken. Geisinger's EHR, EpicCare®, tracks and stores data related to each alert. We queried these data and created a database of more than 27 million alerts deployed in Geisinger's 40 community practice sites over a 7-year period (2002-2009).

Aim 2:
To describe the "natural history" of alerting protocols deployed in Geisinger's primary care population since the EHR's inception, we limited our analysis to Best Practice Alerts (BPAs), as these types of alerts are customizable, point-of-care reminders intended to improve care when used. We manually subdivided BPAs into 10 different categories based on the alert descriptors, including: Medication, Preventive/Process, Preventive/Exam, Preventive/Vaccination, Preventive/Lab, Preventive/Medication, Risk, ePrescribing (eRx), Process, and Research.

Methods: We identified all BPAs fired in the primary care practice from June 2002 – December 2009. Alert-level information was used to determine the type of provider (i.e., physician, nurse) receiving the alert. Each alert's unique identifier (was used to determine the total number of times the alert fired, as well as the number of times each alert was refired before it was closed.

Results:
Growth in Alerts: The use of BPAs within Geisinger Clinic's primary care population has increased exponentially since 2002; nearly two million alerts were fired in 2009 alone (Figure 1). For patients who have had an alert fire, the average number of alerts that fire per patient has increased steadily over time (Figure 2).

Evolution of alert types and frequency of use by type of alert: From 2002-2004, the majority of alerts directed at nurses were preventive/ vaccination reminders (Figure 3). This began to shift in 2005 as preventive/lab alerts were increasingly fired, and later in 2007 when preventive/exam alerts were introduced into clinic workflows (Figure 4).

Aim 3:
To describe the "natural history" of alerting protocols deployed in Geisinger's primary care population since the EHR's inception, we limited our analysis to Best Practice Alerts (BPAs), as these types of alerts are customizable, point-of-care reminders intended to improve care when used. We manually subdivided BPAs into 10 different categories based on the alert descriptors, including: Medication, Preventive/Process, Preventive/Exam, Preventive/Vaccination, Preventive/Lab, Preventive/Medication, Risk, ePrescribing (eRx), Process, and Research (Table 1). Our analytic framework for assessing effectiveness is based on the assumption that alerts that refire multiple times are less effective than alerts that fire relatively fewer times before being closed.

Methods: We identified all BPAs fired in the primary care practice from June 2002 – December 2009. Alert-level information was used to determine the type of provider (i.e., physician, nurse) receiving the alert. Each alert's unique identifier (was used to determine the total number of times the alert fired, as well as the number of times each alert was refired before it was closed.

Results:
Preventive/Medication and Risk alert types had the highest average number of firings before alert closure (Table 2), indicating that these types of alerts may be relatively less effective because they require more refires before they are closed by a provider. The Process and Research alert types had the lowest average number of refires.

Conclusions:
Using refires as a preliminary measure of effectiveness, BPA types vary in their ability to prompt action by a provider.

Additional work
By completing Aim One of this study we generated an alert database of more than 27 million alerts. To further investigate the clinical setting, provider, and patient characteristics of alert natural history, we obtained IRB approval to pull additional data (i.e., in addition to the audit trail data) to expand the investigation beyond the characteristics of individual alerts to include patient, provider and clinic setting (e.g., number of visits per day) in which the alerts fired.

Posters and Abstracts
Jones JB, Lerch V, Leader J, Udoshi S, Darer J, Stewart WF. The Natural History and Comparative Effectiveness of Electronic Alerts in an Integrated Delivery System's Electronic Health Record. Poster session presented at: Academy Health 2011 Annual Research Meeting; 2011 June 12-14; Seattle, WA.

Tables and Figures

Figure 1: BPAs fired from 2002-2009

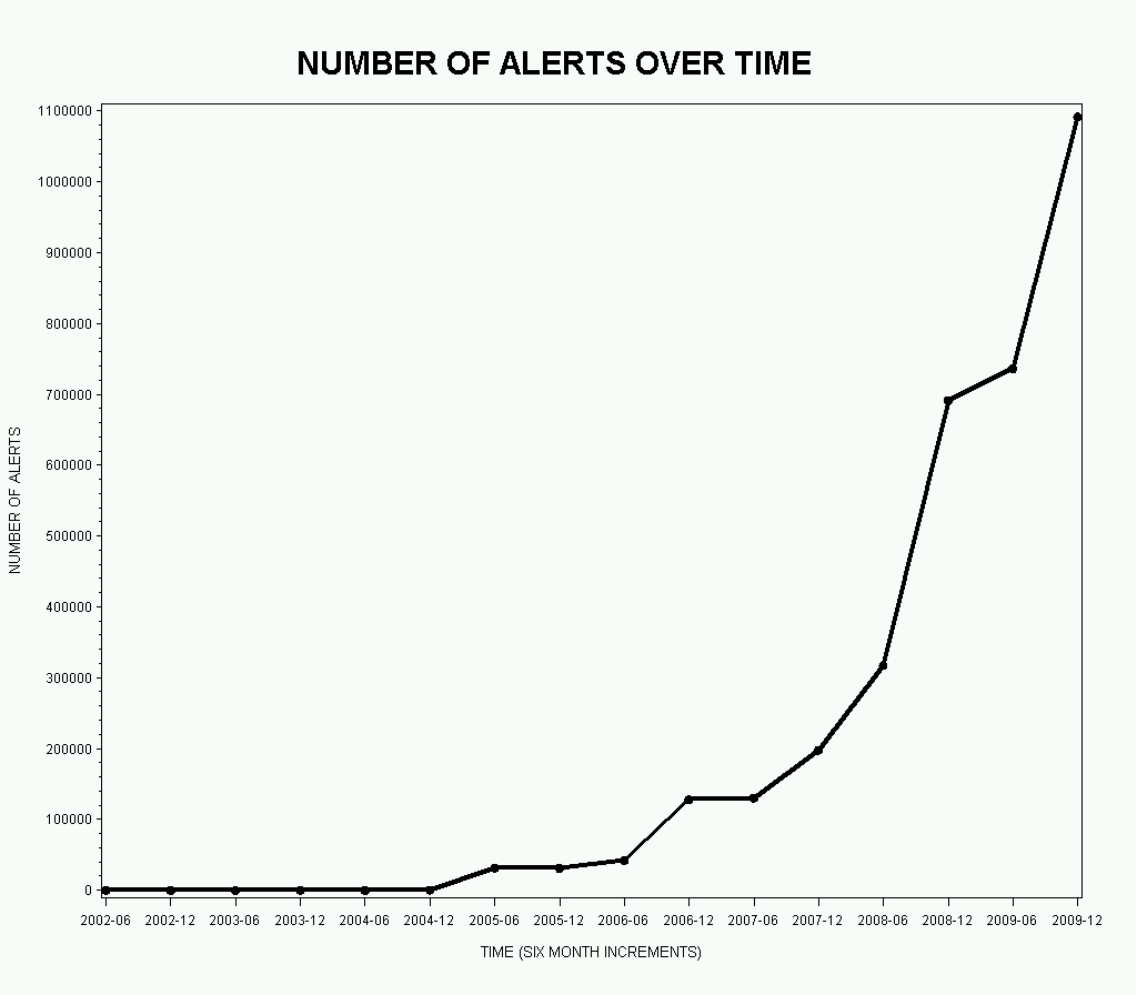

Figure 2: Average number of BPAs fired per patient from 2002-2009

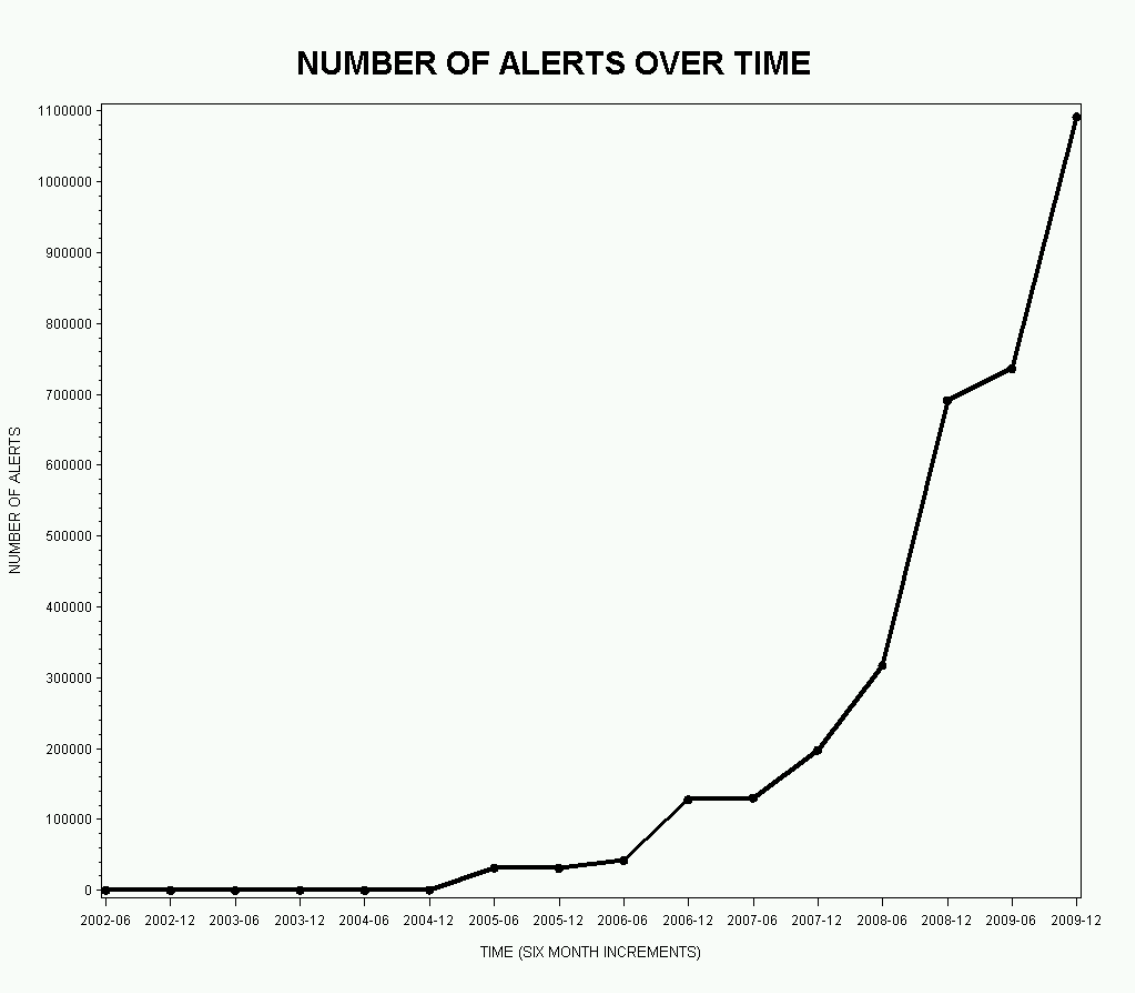

Figure 3: Categorical alerts by provider type, 2002-2004

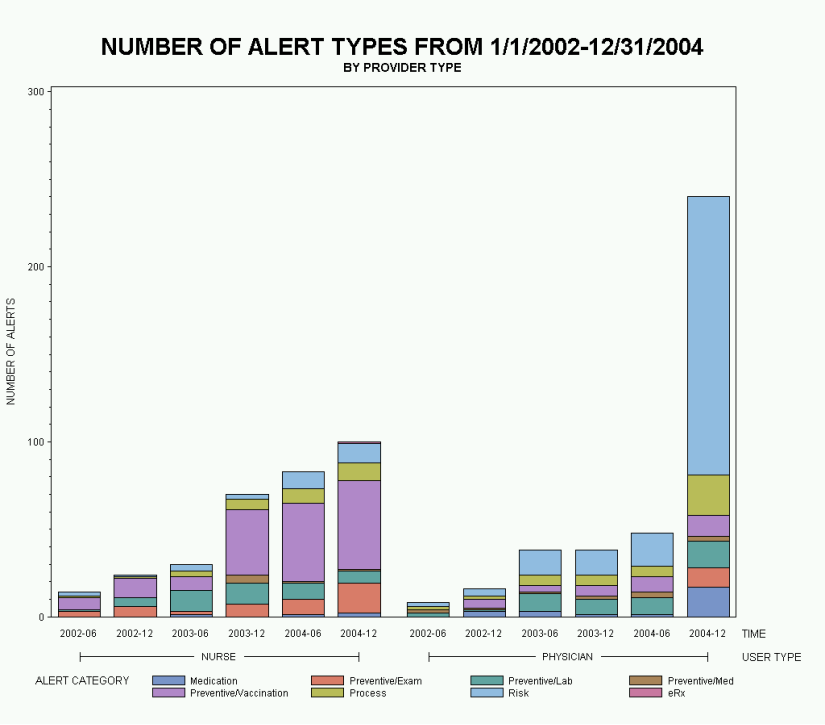

Figure 4: Categorical alerts by Provider type, 2005-2009

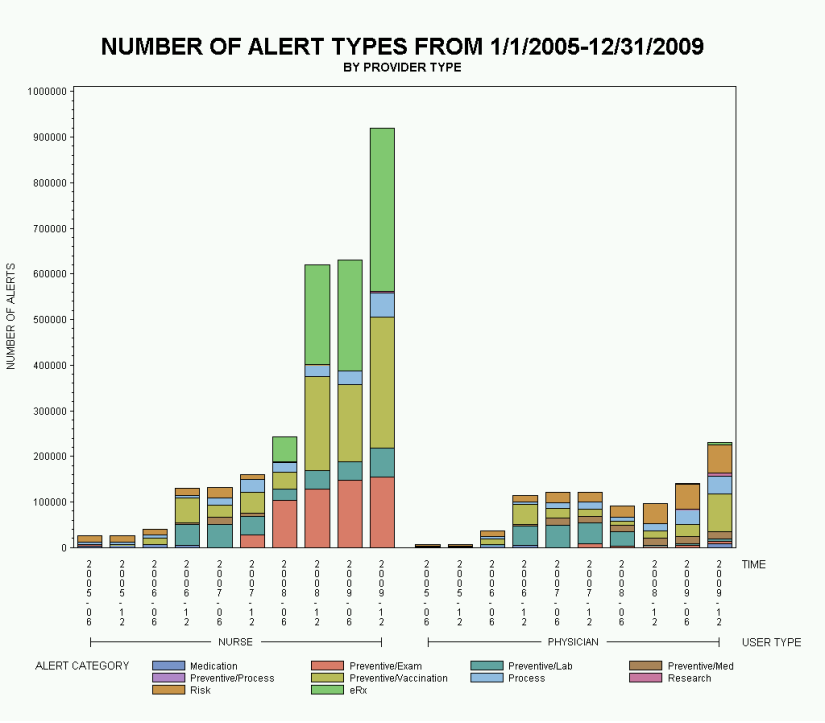

Table 1: BPA sub-categories, description, and examples

Category	Description
Medication	Alerts provider that patient is taking a medication with special characteristics. Does not include drug-drug interaction type alerts.
Preventive/Process	Alerts provider that a care process should be considered
Preventive/Exam	Alerts provider that an indicated exam is due
Preventive/Vaccination	Alerts provider that an indicated vaccination is due
Preventive/Lab	Alerts provider that an indicated lab is due
Preventive/Medication	Alerts provider that an indicated medication should be ordered
Risk	Alerts provider that patient is at-risk due to lab or other EHR-based criteria
ePrescribing (eRx)	Alerts provider that no pharmacy has been selected for electronic transmission of Rx
Process	Alerts provider that a non-preventive type of care process is incomplete
Research	Alerts provider that patient meets eligibility requirements for a research study

Table 2: Alert Effectiveness

Alert Category	Average Times Alert Fired Before Being Closed
Preventive/Medication	7.27
Risk	6.42
Preventive/Lab	4.88
Preventive/Exam	3.88
Preventive/Vaccination	3.62
eRx	3.12
Medication	2.85
Preventive/Process	2.71
Process	2.43
Research	2.04

18. Extent of Clinical Activities Initiated and Completed. Items 18(A) and 18(B) should be completed for all research projects. If the project was restricted to secondary analysis of clinical data or data analysis of clinical research, then responses to 18(A) and 18(B) should be "No."

18(A) Did you initiate a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes

____x__No

18(B) Did you complete a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes
___x___No

If "Yes" to either 18(A) or 18(B), items 18(C) – (F) must also be completed. (Do NOT complete 18(C-F) if 18(A) and 18(B) are both "No.")

18(C) How many hospital and health care professionals were involved in the research project?

_____Number of hospital and health care professionals involved in the research project

18(D) How many subjects were included in the study compared to targeted goals?

_____Number of subjects originally targeted to be included in the study
_____Number of subjects enrolled in the study

Note: Studies that fall dramatically short on recruitment are encouraged to provide the details of their recruitment efforts in Item 17, Progress in Achieving Research Goals, Objectives and Aims. For example, the number of eligible subjects approached, the number that refused to participate and the reasons for refusal. Without this information it is difficult to discern whether eligibility criteria were too restrictive or the study simply did not appeal to subjects.

18(E) How many subjects were enrolled in the study by gender, ethnicity and race?

Gender:
_____Males
_____Females
_____Unknown

Ethnicity:
_____Latinos or Hispanics
_____Not Latinos or Hispanics
_____Unknown

Race:
_____American Indian or Alaska Native
_____Asian
_____Blacks or African American
_____Native Hawaiian or Other Pacific Islander
_____White
_____Other, specify:_____
_____Unknown

18(F) Where was the research study conducted? (List the county where the research study was conducted. If the treatment, prevention and diagnostic tests were offered in more than one county, list all of the counties where the research study was conducted.)

19. Human Embryonic Stem Cell Research. Item 19(A) should be completed for all research projects. If the research project involved human embryonic stem cells, items 19(B) and 19(C) must also be completed.

19(A) Did this project involve, in any capacity, human embryonic stem cells?
_____Yes
___x___ No

19(B) Were these stem cell lines NIH-approved lines that were derived outside of Pennsylvania?
_____Yes
_____ No

19(C) Please describe how this project involved human embryonic stem cells:

20. Articles Submitted to Peer-Reviewed Publications.

20(A) Identify all publications that resulted from the research performed during the funding period and that have been submitted to peer-reviewed publications. Do not list journal abstracts or presentations at professional meetings; abstract and meeting presentations should be listed at the end of item 17. **Include only those publications that acknowledge the Pennsylvania Department of Health as a funding source** (as required in the grant agreement). List the title of the journal article, the authors, the name of the peer-reviewed publication, the month and year when it was submitted, and the status of publication (submitted for publication, accepted for publication or published.). Submit an electronic copy of each publication or paper submitted for publication, listed in the table, in a PDF version 5.0.5 (or greater) format, 1,200 dpi. Filenames for each publication should include the number of the research project, the last name of the PI, the number of the publication and an abbreviated research project title. For example, if you submit two publications for PI Smith for the "Cognition and MRI in Older Adults" research project (Project 1), and two publications for PI Zhang for the "Lung Cancer" research project (Project 3), the filenames should be:

Project 1 – Smith – Publication 1 – Cognition and MRI
Project 1 – Smith – Publication 2 – Cognition and MRI
Project 3 – Zhang – Publication 1 – Lung Cancer
Project 3 – Zhang – Publication 2 – Lung Cancer

If the publication is not available electronically, provide 5 paper copies of the publication.

Note: The grant agreement requires that recipients acknowledge the Pennsylvania Department of Health funding in all publications. Please ensure that all publications listed acknowledge the Department of Health funding. If a publication does not acknowledge the funding from the Commonwealth, do not list the publication.

Title of Journal Article:	Authors:	Name of Peer-reviewed Publication:	Month and Year Submitted:	Publication Status (check appropriate box below):
1.				☐Submitted ☐Accepted ☐Published
2.				☐Submitted ☐Accepted ☐Published
3.				☐Submitted ☐Accepted ☐Published

20(B) Based on this project, are you planning to submit articles to peer-reviewed publications in the future?

Yes____x_____ No_____

If yes, please describe your plans:

We will continue to develop a more robust definition of alert effectiveness. We also plan to examine how alerts were impacted by other factors at the clinic, provider and patient level (e.g., time of day, provider patient panel size, patient comorbidities). This will be the focus of the publication.

21. Changes in Outcome, Impact and Effectiveness Attributable to the Research Project.
Describe the outcome, impact, and effectiveness of the research project by summarizing its impact on the incidence of disease, death from disease, stage of disease at time of diagnosis, or other relevant measures of outcome, impact or effectiveness of the research project. If there were no changes, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

None

22. Major Discoveries, New Drugs, and New Approaches for Prevention Diagnosis and Treatment. Describe major discoveries, new drugs, and new approaches for prevention, diagnosis and treatment that are attributable to the completed research project. If there were no major discoveries, drugs or approaches, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

None

23. Inventions, Patents and Commercial Development Opportunities.

23(A) Were any inventions, which may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of work under this health research grant? Yes_____ No___x_____

If "Yes" to 23(A), complete items a – g below for each invention. (Do NOT complete items a - g if 23(A) is "No.")

a. Title of Invention:

b. Name of Inventor(s):

c. Technical Description of Invention (describe nature, purpose, operation and physical, chemical, biological or electrical characteristics of the invention):

d. Was a patent filed for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No___

If yes, indicate date patent was filed:

e. Was a patent issued for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No___
If yes, indicate number of patent, title and date issued:
Patent number:
Title of patent:
Date issued:

f. Were any licenses granted for the patent obtained as a result of work performed under this health research grant? Yes_____ No___

If yes, how many licenses were granted?_____

g. Were any commercial development activities taken to develop the invention into a commercial product or service for manufacture or sale? Yes___ No____

If yes, describe the commercial development activities:

23(B) Based on the results of this project, are you planning to file for any licenses or patents, or undertake any commercial development opportunities in the future?

Yes_____ No____x_____

If yes, please describe your plans:

24. Key Investigator Qualifications. Briefly describe the education, research interests and experience and professional commitments of the Principal Investigator and all other key investigators. In place of narrative you may insert the NIH biosketch form here; however, please limit each biosketch to 1-2 pages. *For Nonformula grants only – include information for only those key investigators whose biosketches were not included in the original grant application.*

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Walter F. Stewart, PhD, MPH	Director, Associate Chief Research Officer
eRA COMMONS USER NAME (credential, e.g., agency login) WFStewart	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
University of California, Riverside	BS	1974	Psychology/Biology
University of California, Los Angeles	MPH	1977	Epidemiology
Johns Hopkins University	PhD	1983	Epidemiology

A. Positions and Honors.

1983 - 1990 Assistant Professor of Epidemiology, Johns Hopkins University School of Public Health

1990 - 1995 Associate Professor of Epidemiology, Johns Hopkins University School of Public Health

1992 - 1995 Joint appointment, Department of Environmental Health Sciences, Division of Occupational Medicine, Johns Hopkins University School of Hygiene and Public Health

1995 - Adjunct Associate Professor of Epidemiology, Johns Hopkins University School of Public Health

1995 - 2000 President, Innovative Medical Research, Baltimore, MD

2000 - 2003 Vice-President, Research and Development, AdvancePCS, Baltimore, MD

2001- Adjunct Professor of Epidemiology, Johns Hopkins University Bloomberg School of Public Health

2002- Director, Center for Health Research, Geisinger Health Systems, Danville, PA

2005- Associate Chief Research Officer, Geisinger Health Systems, Danville, PA

Recent National Committee Appointments and Editorial Boards

2008 - Advisory Board, Group Health Cooperative, Health Research Institute

2008- Editorial Board, Neuroepidemiology

2009 - Vice-Chairman, HMO Research Network Governing Board

2009- AcademyHealth, Working Group member on HIT Data for Actionable Knowledge

2009 - IOM, Committee on Standards for Developing Trustworthy Clinical Practice Guidelines

2010 - Advisory Board, Johns Hopkins University, Division of Health Sciences Informatics University Training Program

2011- Chairman, HMO Research Network Governing Board

B. Selected peer-reviewed publications. (selected from 270 peer-reviewed publications)

1) Stewart WF, Shah NR, Selna MJ, Paulus RA, Walker JM. Bridging the Inferential Gap: The Electronic Health Record and Clinical Evidence. *Health Affairs 2006, 26: w181-w191*.

2) Steele GD, Haynes JA, Davis DE, Tomcavage J, **Stewart WF**, Graf TR, Paulus RA, Weikel K, Shikles J. How Geisinger's advanced medical home model argues the case for rapid-cycle innovation. Health Aff (Millwood). 2010;29:2047-53.

3) Wu J, Roy J, **Stewart WF**. Prediction modeling using EHR data: challenges, strategies, and a comparison of machine learning approaches. Med Care. 2010; 48 (6 Suppl):S106-13
4) Jones JB, Bruce CA, Shah NR, Taylor WF, **Stewart WF**. Shared Decision-Making: Using Health Information Technology to integrate patient choice into primary care. *Translational Behavioral Medicine: Practice, Policy and Research* 2011[In Press]
5)Jones JB, Shah NR, Bruce CA, **Stewart WF**. Meaningful Use: Using Patient Specific Risk in an EHR for Shared Decision Making. *American Journal of Preventive Medicine - Special Supplement on Cyberinfrastructure and Consumer Health* 2011 [In Press]

6)Ayoub WT, Newman ED, Blosky MA, **Stewart WF**, Wood GC. Improving detection and treatment of osteoporosis: redesigning care using the electronic medical record and shared medical appointments. Osteoporos Int. 2008, 20:37-42.
7) Wood GC, Spahr R, Gerdes J, Daar ZS, Hutchison R, **Stewart WF.** Patient satisfaction and physician productivity: complementary or mutually exclusive? Am J Med Qual. 2009;24:498-504
8) Shah NR, Hirsch AG, Zacker C, Wood GC, Schoenthaler A, Ogedegbe G, **Stewart WF.** Predictors of first-fill adherence for patients with hypertension. Am J Hypertens. 2009; 22:392-6.
9) Jones JB, Bruce CA, Shah NR, Taylor WF, **Stewart WF**. Shared Decision-Making: Using Health Information Technology to integrate patient choice into primary care. *Translational Behavioral Medicine: Practice, Policy and Research* 2011[In Press]

C. Research Support

R01 DK082551 (STEWART, WALTER) 7/15/2009 - 6/30/2014 1.8 CM
NIH $338,336
NATURAL HISTORY OF STRESS, URGE AND MIXED URINARY INCONTINENCE IN WOMEN
The goal of this project is to understand why stress and urge urinary incontinence co-occur substantially more often than expected.

No assignment # (STEWART, WALTER) 11/19/2008 - 11/18/2012 0.12 CM
GEISINGER MEDICAL MANAGEMENT
E-DIABETES: BRIDGING THE GAP BETWEEN KNOWLEDGE AND PRACTICE IN PRIMARY CARE MANAGEMENT OF TYPE II DIABETES: PHASE I

1R01HS019912-01 (STEINER, JOHN) 9/1/2010 - 8/31/2013 1.2 CM
KAISER PERMANENTE
SCALABLE PARTNERING NETWORK FOR CER: ACROSS LIFESPAN, CONDITIONS, AND SETTINGS

RC4 (Site PI: STEWART, WALTER) 9/1/2010 - 8/31/2013 1.8 CM
Univ. of Pennsylvania $446,331
A RANDOMIZED TRIAL OF BEHAVIORAL ECONOMIC INTERVENTIONS TO REDUCE CVD RISK
Using a multi-arm cluster-randomized controlled trial among primary care physicians and their patients at very high risk of cardiovascular disease (CVD) at Geisinger Health System and the University of Pennsylvania outpatient clinics, we propose to test the effectiveness and cost effectiveness of providing lottery-based financial incentives to physicians and to physicians in combination with their high risk patients on reducing CVD risk.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Jones, James Brian (J.B.)	POSITION TITLE Research Investigator I
eRA COMMONS USER NAME	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of California at Davis – California	BS	1995 - 1997	Physiology
Brigham Young University – Utah	MBA	2000 - 2002	Business Administration
Johns Hopkins Bloomberg School of Public Health – Maryland	PhD	2002 - 2008	Health Services and Outcomes Research

A. Positions and Honors

Positions and Employment

1997-1998 Clinical Research Coordinator, Cardiovascular Clinical Trials Unit, Department of Internal Medicine, UC Davis Medical Center, Sacramento, California

1998-2000 Regulatory Affairs Associate, Arterial Vascular Engineering, Santa Rosa California

2000-2000 Regulatory Affairs Specialist, Medtronic Inc. (formerly Arterial Vascular Engineering), Santa Rosa, California

2001-2001 Intern, Health Care Leadership Training Program, CIGNA Healthcare, Bloomfield, CT

2002-2003 Regulatory Affairs and Quality Assurance Consultant, MitraLife Inc., Santa Rosa, CA

2005-2008 Research Associate, Geisinger Center for Health Research, Danville, PA

2008 - Research Investigator I, Geisinger Center for Health Research, Danville, PA

Honors

2002 Hawes Scholar, Marriott School of Management, Brigham Young University, Provo, UT (Highest honor given to MBA students, based on academic achievement, leadership maturity, and commitment to high ethical standards; includes $10,000 award)

2002-2004 National Research Service Award Pre-doctoral Trainee (Johns Hopkins)

B. Selected Peer-Reviewed Publications

1. **Jones JB**, Bruce CA, Shah NR, Steward WF. The Preference-Based Care Tool: Using HIT to Integrate Patient Choice Into Primary Care CVD Management. *Translational Behavioral Medicine*. 2011 March; 1(1); 123-133.
2. **Jones JB**, Shah NR, Bruce CA, Stewart WF. Meaningful Use of EHRs by Incorporating Quantitative Patient-Specific Risk Information During Routine Primary Care. *Am J Prev Med*. 2011 May;40(5 Suppl 2):S179-86.

3. **Jones JB**, Snyder CF, Wu AW. Issues in the **Design** of Internet-based Systems for Collecting Patient-Reported Outcomes. *Quality of Life Research* 2007; Oct;16(8):1*407-17.*
4. *Shah NR, **Jones JB**,* Aperi J, Shemtov R, Karne A, Borenstein J. Selective serotonin reuptake inhibitors for premenstrual syndrome and premenstrual dysphoric disorder: a systematic review and meta-analysis. *Obstetrics & Gynecology* 2008; May; 111(5):1175-1182.
5. **Jones JB**, Blecker S, Shah NR. Meta-Analysis 101: What You Need to Know in the Era of Comparative Effectiveness. *American Health & Drug Benefits* 2008; April; 1(3): 38-43.
6. Berger JS, Bhatt DL, Cannon CP, Chen Z, Jiang L, **Jones JB**, Mehta SR, Sabatine MS, Steinbuhl SR, Topol EJ, Berger PB. The Relative Efficacy and Safety of Clopidogrel in Women and Men: A Sex-Specific Collaborative Meta-Analysis of CURE, CREDO, CLARITY-TIMI 28, COMMIT, and CHARISMA. *Journal of the American College of Cardiology* 2009 Nov 17;54(21):1935-45.
7. Shah NR, **Jones JB**, Daar Z, Stewart WF. Are Early Adopters Of A Web-Based Patient Portal More Activated Than Matched Controls? [Abstract] *AcademyHealth Annual Research Meeting*, June 2006.
8. **Jones JB,** Shah NR, Daar Z, Schwartz S, Stewart WF. EHR-based physician alerts increase uptake of an e-health intervention for chronically-ill patients. [Abstract] *HMO Research Network,* March 2007.
9. **Jones JB**, Shah NR, Daar ZS, Walker J, Ladd I, Stewart WF. The Next Step: Achieving Health Behavior Change Through Technology. [Oral Presentation] *HMO Research Network*, April 2008.

C. Research Support: <u>Selected Ongoing Research Support</u>

Ortho McNeill Janssen (Stewart) 12/09-12/12
eLowBackPain: Low Back Pain Management in Primary Care. The goal of this project is to develop a web-based and EHR-linked application that assists primary care providers in delivering guideline-based care to patients with low back pain through the collection of structured, patient-reported data, guideline-based decision support, automated order entry, and the automatic creation of visit documentation for import back into an EHR. Role: Co-Investigator.

Geisinger Health Plan (Stewart) 7/11 – 6/13
eLow Back Pain Expansion in Geisinger Primary Care Clinics
The goal of this project is to expand the use of an EHR-linked application for managing low back pain to multiple clinic sites. Role: Co-Investigator

Geisinger Health Plan (Stewart) 7/11 – 6/13
Advance Care Planning, Phase 1
The goal of this project is to build both an application for improving Geisinger's ability to engage patients in advanced care planning. The tool will be used both in ambulatory clinics and online. Role: Co-Investigator

Geisinger Health Plan (Stewart) **7/11 – 6/13**

Primary Care Workflow and Simulation Modeling

The purpose of this project is to build an analytic database for characterizing primary care workflows using EHR and other administrative, billing, and related data sources. This database will then support simulation modeling activities to address key health services research questions.

Role: Co-Investigator