Technical Brief Disposition of Comments Report

Research Review Title: *Core Functionality in Pediatric Electronic Health Records*

Draft review available for public comment from November 25, 2014 to December 23, 2014.

Research Review Citation: Dufendach KR, Eichenberger JA, McPheeters ML, Temple MW, Bhatia HL, Alrifai MW, Potter SA, Weinberg ST, Johnson KB, Lehmann CU. Core Functionality in Pediatric Electronic Health Records. Technical Brief No. 20. (Prepared by the Vanderbilt Evidence-based Practice Center under Contract No. 290-2012-00009-I.) AHRQ Publication No. 15-EHC014-EF. Rockville, MD: Agency for Healthcare Research and Quality. April 2015. www.effectivehealthcare.ahrq.gov/reports/final.cfm.

Comments to Research Review

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The tables below include the responses by the authors of the review to each comment that was submitted for this draft review. The responses to comments in this disposition report are those of the authors, who are responsible for its contents, and do not necessarily represent the views of the Agency for Healthcare Research and Quality.

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Commenter	Section	Comment	Response
Key Informant #1	General	Forms that parents need for school, camp, relocation that are generated from the EHR are not addressed	We have added this to the routine health care maintenance section, where we note the importance of supplying after-visit summaries and school and athletics forms.
Key Informant #1	General	I think the document would benefit from applying the ecological model to the child's health and the EHR intersection in all of the spheres of the child's health care	Thank you for your comment. This is unfortunately outside the scope of this project.
Key Informant #1	General	Mental health issues related to EHR not addressed comprehensively - privacy, disclosure....	Thank you for your comment regarding mental health privacy and disclosure. Although there are many facets to supporting mental health extensively, we think specific EHR issues will be addressed by supporting privacy settings more generally, which we have included in the adolescent privacy section.
Key Informant #1	General	Often the term physician or pediatrician is used when provider is more accurate.	We have edited the report throughout to change "pediatrician" to "provider" and "pediatrics" to "child health".
Key Informant #1	General	Privacy is addressed only from the adolescent point of view and the parent's access of the record, when the privacy of child health conditions is important for sensitive conditions at all ages.	Thank you for your comments. We agree that privacy is important for children of all ages for many different conditions. However, neither our literature review nor our discussions with Key Informants identified specific conditions that were more pediatric-specific other than the specific adolescent issues mentioned. We think that most of the general privacy concerns for sensitive conditions will be addressed by incorporating better privacy settings for people of all ages.

Commenter	Section	Comment	Response
Key Informant #1	General	The tone of the document is very health care centric and not child or family focused. The EHRs usefulness and impact on them is not discussed. One example is that the transitions discussed are all concerning health care transitions and not the transitions the child makes and needing continuity of care between day care to school, grade school to high school, high school to college. And not transitions from acute care to school care.	Thank you for your comments. We agree that children have many different care transitions, amongst which you have mentioned, including many school-related transitions. For the scope of this document, we have focused on transitions that occur within the healthcare system and specifically those that involve the outpatient primary pediatric provider.
Key Informant #1	General	With the goal of this document, that paradigm will not serve some aspects of well informed decisions, improved quality of care (page ii).	The material in the preface is generated by the EHC program.
Key Informant #2	General	I was very pleasantly surprised by the quality of this report. As a 'vendor,' I am quite cynical about the requirement making process of those who do not work in independent practices, but the authors struck an excellent balance between striving for clinical excellence and practical understanding.	Thank you
Key Informant #2	General	It was particularly rewarding to note that the report focuses on the usability and speed of new functionality as a crucial (and presently missing) piece of the puzzle.	Thank you
Peer Reviewer #1	General	This is a timely report and a very difficult one to accomplish. The authors did an excellent job in providing the appropriate attention to pediatric specificity, given the dearth of evidence in the literature. This review serves as a perfect companion to the CHIPRA pediatric EMR format. I am hoping that this report will lead to efforts that positively impact market adoption of pediatric EMR functions, such as EMR certification, consumer demand, etc.	Thank you

Commenter	Section	Comment	Response
Peer Reviewer #2	General	I have a variety of minor concerns that are described in my detailed remarks. Of note, there are grammatical and typographical issues that are at times distracting. I recommend a thorough editorial review to ensure this important document is of the highest quality.	We have edited the report.
Peer Reviewer #2	General	Overall this technical brief accurately describes the information that the authors were able to diligently gather. After reading the report I felt the primary call to action is for pediatric and informatics researchers to improve the quality of the evidence base and clinical practice guidelines. If this is not the authors' intended message then some re-framing may be needed to make the intended message clear.	No Response Needed
Peer Reviewer #2	General	Using a set of guiding questions, this AHRQ Technical Brief describes EHR features that may be important to the delivery of outpatient (primary care) pediatric healthcare, and clearly indicates the need for more research to assess the potential impact of these features. The primary data sources were interviews with key informants and literature review. The patient and family perspectives on these issues were not directly obtained. EHR uptake among pediatricians has lagged behind other specialties, and the evidence base related to pediatric EHR features and their impact on child health is unfortunately limited. Therefore this technical brief is important. The purpose of this document is well described in the preface materials.	Thank you
Peer Reviewer #3	General	This is an outstanding report generated by leaders in the field. As I thought through potential key informants, two of the authors (i.e., Kevin Johnson and Chris Lehmann) led the list. This technical report reviews the key components of a pediatric EHR. There are several specific suggestions that could improve clarity and applicability, but overall the report is done very well.	Thank you

Commenter	Section	Comment	Response
Peer Reviewer #4	General	This is a superbly crafted report based on the literature and the users and vendors of the pediatric EMR. It is so extensive that it would be helpful to have an executive summary that lists off the requirements. For instance there are tables after the sections where there are specific recommendations. These can be pulled together as a quick guide for pediatricians considering the purchase of an EMR and a quick reference for vendors evaluating their EMR pediatric knowledge base.	This is an excellent suggestion. The format of the EPC Technical Brief is set by AHRQ, but there will be opportunities for dissemination of the material that could follow this recommendation.
Peer Reviewer #5	General	This is a well-written important report.	Thank you
Peer Reviewer #6	General	I thought this was an interesting report and certainly an area of interest as I was a cited author and one of the originators of the premise that pediatricians are adopting health IT that is not necessarily well suited to the practice of pediatrics.	Thank you
Peer Reviewer #7	General	Clearly this document represents a lot of thinking and extensive work related to information gathering and summarization. Overall it is an important document that will focus work done over the coming years. The authors acknowledge that there is considerable overlap between functional specifications for systems designed for children and those designed for adults. They appropriately try to target those most important and/or unique for children. At a very high level, the brief does highlight numerous specific issues, helps prioritize better where to focus within the Model Pediatric EHR Format, and does a very extensive review of the literature that will be updated before final publication. Several general areas bear additional consideration by the authors. Listed below are general comments.	No Response Needed

Commenter	Section	Comment	Response
Peer Reviewer #7	General	The use of “pediatric” to describe systems that are actually targeting infants, children, adolescents, and their caregivers. Acknowledging that there are many non-pediatric clinicians that care for children and the use of phrases like “child health” rather than pediatric health may be worth considering or at least acknowledging that the use of pediatric is for brevity recognizing that nurses, family doctors, etc. routinely provide “pediatric” care.	We have edited the report throughout to change "pediatrician" to "provider" and "pediatrics" to "child health".
Peer Reviewer #7	General	There is a relative absence of discussion related to the critical need for actual content (specific questions, validated instruments, scoring rules) within the pediatric EHR (PEHR). It goes without saying that all EHRs have the ability to include questions and to capture their answers – so this function is not unique to the PEHR but many care settings do not have the ability to include the questions that are relevant for children. Nor are these questions well standardized and/or available to vendors.	Thank you for your comment. We agree that it is important to include validated data collection instruments and scoring rules/forms within the pediatric EHR. We refer to this in the "Data and Billing" section, where we mention "customized data entry." We have also added screening tools or patient-provided forms as examples of validated instruments. The functionality for forms in an EHR is recommended, but it is beyond the scope of this brief to suggest specific forms to be included in an EHR.
Peer Reviewer #7	General	There is also a relative absence of discussion in the brief related to pediatric self-care as an extension of the EHR. With growing use of portals, pre-visit assessments, and waiting-room based systems (which are not unique to pediatric populations or the pediatric EHR) comes a need to tailor they systems used as well as the content (questions asked, literacy level, etc) to the ages of the patients (and caregivers) using them.	Thank you for your comment. We agree that pediatric portals and other patient-entered data are important to incorporate into the EHR. We have added language in the newly renamed Routine Health Care Maintenance section to refer to the importance of utilizing patient provided information from either pre-visit questionnaires or patient portals. While recommending specific pre-visit screening tools is beyond the scope of this brief, we do address the important privacy issues that must be addressed with adolescent portals in the "Privacy" section.

Commenter	Section	Comment	Response
Peer Reviewer #7	General	There is also a relative absence of discussion related to the critical need for consumers, clinicians, vendors, and regulators to collaborate since no one of these groups can lead the effort alone. In particular, key stakeholders need to include non-clinicians at every level.	This is a very important point, but just outside of the scope of this paper. We recognize that many passionate providers wish to effect changes in the state of national EHRs. Our hope is that this document will provide some leverage for providers to insist on workable vendor solutions in whatever solution they choose to or are forced to implement.
Peer Reviewer #8	General	The presentation of the information collected for this technical report is thorough but some of the writing is unclear (see comments in the findings section). The summary, implications, and next steps need more detail and thoughtful analysis to be useful to readers of this report.	Thank you for your comments. We have tried to limit the summary/implications and next steps sections to mention briefly areas for improvement, prompting the reader to look at the text for more specific recommendations.
Public Reviewer (AAP)	General	As supporters of improving functionality of pediatric EHRs, we would like to take this opportunity to comment on several issues highlighted in the draft technical report that we believe are important to build better pediatric EHR functionality, as well as some issues that we encourage the report's author's to expand upon in the final version of the report. [see the comments from Reviewer 11 (AAP) for the areas/topics that should be expanded.]	No Response Needed.

Commenter	Section	Comment	Response
Public Reviewer (APTA)	General	We believe that this technical brief on Core Functionality in Pediatric Electronic Health Records is very important for the interprofessional collaborative care of the pediatric patient. We would like to stress the importance of involving the entire patient care team. There are many more service providers, in addition to the pediatrician that provide care to children and document in the medical record. It is very important to include these disciplines in the EHR in order to deliver best care and allow for coordination of care among disciplines. This is especially true for subpopulations such as those with physical disabilities. We would hope that including physical therapists and other non-physician providers throughout the technical brief would be helpful in addressing the functionalities of the electronic medical record most comprehensively	You are correct. We have edited the report to refer to the provider more generally. Children's health is certainly attended to by a team of professionals, and we agree that a fully functional EHR used for children would incorporate functionality specific for all types of providers. For this report, we did attempt to narrow our scope to functionality that is specifically related to the primary care provider, although we hope many of these other groups will also benefit from this functionality.
Public Reviewer (EHRA)	General	Content must be open, agreed upon, actionable, and available in an electronic format. The community will benefit from non-proprietary “gold standard” content that can be modified as necessary to adjust to local needs	Thank you for your comment. We agree with your assertion. In order to address this from a PEHR perspective, we have recommended that providers be able to include custom forms/templates in the "Documentation and Billing" section. Unfortunately, we are unable to influence whether or not the copyright holders of forms and screening questionnaires release their content to the public domain, or at least for free reproduction.
Public Reviewer (EHRA)	General	Standardizing or dictating the presentation of content (especially, requiring EHR displays and workflows to match existing printed forms), may not meet users’ needs and may actually run counter to user-centered design (UCD) principles.	Thank you for your comment. We agree that this could be an issue with user-centered design principles. It would be ideal to have customizable forms that the user can modify to meet his or her specific user-centered needs. We have added some more detail in the "Documentation and Billing" section to highlight this.
Public Reviewer (EHRA)	General	The EHRA supports freely available and consensus-based guidelines for pediatric features in EHRs. We make the following recommendations to speed implementation: [see comments from Reviewer #11 (EHRA)]	No Response Needed.

Commenter	Section	Comment	Response
Public Reviewer (EHRA)	General	We are encouraged by the vision of bi-directional exchange of vaccination information. Indeed, meaningful use has helped to standardize outgoing messages from our systems. To complete the vision offered by the report, state registries must agree to standard reporting requirements in order to avoid costly state-specific variances	We agree that this is an important issue and debated about whether to include interstate specific language in this brief. However, the scope of this brief is toward EHR functionality for the pediatric PCP, and this topic seems more geared toward the health information exchange domain. As such, we have limited our wording to "incorporating data from immunization registries, including interstate registries, when available." We have added, "including interstate registries". Of note, there is an ongoing review of Health Information Exchange (HIE) to identify and synthesize evidence on the extent to which HIE is effective in improving a variety of outcomes and how the impact varies by different approaches to HIE. The report will also identify evidence on levels of use, and usability of HIE, as well as facilitators of and barriers to HIE. (http://effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?productid=1943&pageaction=displayproduct)
Public Reviewer (EHRA)	General	We recognize the struggle currently faced by pediatricians in managing families' access to children's information. Health IT developers face the same struggle: privacy laws and regulations are state-specific and often unclear. Provider organizations and vendors alike would benefit from consistent, clear guidance and a legislative push toward convergence. The more clearly-defined and reproducible the privacy laws, the easier they are to convert to computable privacy directives	No Response Needed.

Commenter	Section	Comment	Response
Public Reviewer (Matt Elrod)	General	We believe that this technical brief on Core Functionality in Pediatric Electronic Health Records is very important for the interprofessional collaborative care of the pediatric patient. We would like to stress the importance of involving the entire patient care team. There are many more service providers in addition to the pediatrician that provide care to children and document in the medical record. It is very important to include these disciplines in the EHR in order to deliver best care and allow for coordination of care among disciplines. This is especially true for subpopulations such as those with physical disabilities. We would hope that including physical therapists and other nonphysician providers throughout the technical brief would be helpful in addressing the functionalities of the electronic medical record most comprehensively.	You are correct. We have edited the report to refer to the provider more generally. Children's health is certainly attended to by a team of professionals, and we agree that a fully functional EHR used for children would incorporate functionality specific for all types of providers. For this report, we did attempt to narrow our scope to functionality that is specifically related to the primary care provider, although we hope many of these other groups will also benefit from this functionality.
Peer Reviewer #9	General	This is an excellent topic for a technical review that elevates the conversation around pediatric requirements for EHR to an evidence based level by exploring impact on practice rather than driving the issue solely by expert opinion. Perhaps the most significant feature of this technical report is to highlight the limited data available to document the importance of pediatric requirements. The limited availability of EHR with well-implemented pediatric features has been a factor in limited data and hopefully this report will stimulate more research and efforts to document and substantiate the difference between pediatric and adult care and the differences in the roles and expectations of the impact of EHR on practice. Greater emphasis on the importance of interoperability between pediatric EHR and public health not only in areas such as immunizations, but also in newborn screening, growth norms, and infectious disease might have received more attention.	Thank you for your comments. Yes, we do hope one of the major results of this brief is to highlight the limited data available, and we hope this will stimulate more research into pediatric-specific functionality in the EHR. We agree that we as clinicians could expand significantly on interoperability in the areas you mention. Unfortunately, there was relatively little said about these specific topics in the literature or by our key informants, so we have decided to mention these as issues but to keep our exposition brief.

Commenter	Section	Comment	Response
Key Informant #1	Background	A model EHR needs to interface with all providers in the community who participate in the core functionalities, not necessarily those in outpatient or hospital settings. For instance, school located vaccines, growth and development records in schools and readiness and outreach programs.	Thank you for your comments. Certainly, children interact in many different environments, many of which also incorporate health care information, such as day care, school, athletics, and camp. For the scope of this document, we have focused on the use of the EHR specifically in the outpatient primary pediatric provider setting. We do mention this secondary use of data in the "GQ4 Dissemination and future developments" section, as well as the vaccines and development sections of GQ1. We have also now added a comment in the "Documentation and Billing" subsection of GQ1.
Peer Reviewer #1	Background	the line references HL7 requirements, this requires a footnote; or reference that user can go to to learn more about the HL7 child health functional profile.	We have added both a footnote and reference for HL7. Thank you.
Peer Reviewer #1	Background	hard to distinguish between footnote and reference. I suggest change the superscript notation to clearly differentiate references.	Thank you for the suggestion. We have used the standard format for citing references in the document. The footnotes are cited by letter, the references cited by number. We believe these notations will be clear in the published version.
Peer Reviewer #2	Background	Replace “grey” with “gray” for consistency	We have changed "grey" to "gray" for consistency.
Peer Reviewer #2	Background	This section is well written and appropriately orients the reader to this document.	Thank you
Peer Reviewer #3	Background	Very well done. Succinct. Appropriate framing.	Thank you
Peer Reviewer #4	Background	One of the reasons for inadequate pediatric implementation is that pediatric patients don't have the dollar amount impact on the cost of healthcare. Also the AAP has put a big price tag on the license of their content. This has been an barrier to the incorporation of this content into the EMR. It would be interesting to research the extent to which this enters the decision making of the vendors.	Yes, this very issue came up in our discussion with our Key Informants. Instead of focusing on the limited dollar impact on the pediatric EHR, we decided to focus on the main incentives for developing pediatric functionalities, such as patient safety and clinical quality measures. Regarding the cost of licensed content, we have added a comment as such into the barriers to implementation section in the Routine Health Care Maintenance section.

Commenter	Section	Comment	Response
Peer Reviewer #4	Background	This section is an extensive review of the landscape as it was. The state of the industry has moved from data entry (although very important) to the area of data analysis and connectivity. Most EMRs fall short in this area and there needs to be more direction to give the user more tools.	No response Needed.
Peer Reviewer #6	Background	It was OK. I was surprised to see no mention of the CCHIT efforts although certainly those efforts are now defunct. It does look like you interviewed Mark Del Beccaro who would certainly have been well versed in those efforts.	Unfortunately as important as the CCHIT activities were, their impact on the literature was limited. A PubMed search on CCHIT revealed 18 references only, and adding pediatric to the search term resulted in no relevant papers. Even as a key informant, Mark did not include CCHIT activities in his discussions with us. CCHIT recently ceased operations in November of 2014 (https://www.cchit.org/home), and their website now contains very little actual content. We are left with only the cited impact in the literature and individuals' recollections of its impact. We found no significant articles that we deem essential for the future direction of the EHR.
Peer Reviewer #7	Background	I think many adult focused care providers would suggest that adults don't necessarily stay static either. Other than height, many things about adults change based on clinical and social factors. Some adults also shrink over time of course. Adults change differently than children but they can be dynamic with regard to multiple factors and functions.	Thank you for your comment. True, the very nature of any human being is the static nature of their health. We have removed the mention of "static" adults, replacing this with an emphasis on the importance of supporting the dynamic physiology and development of children.
Peer Reviewer #7	Background	The authors state that results are inconsistent with regard to evaluation for the PEHR but do not provide examples. Are the authors commenting on bad study design, or a lack of evidence, or the inherent complexity of evaluating a multi-faceted intervention like an EHR? More detail would be helpful.	The empirical literature is described in Guiding Question 3 and the inconsistency is based on inconsistency in outcomes as reported in the studies.
Peer Reviewer #7	Background	The authors may consider adding more text related to areas suggested in "General Comments" section to the Background if any are expanded.	Thank you. We have reviewed this section and added text as appropriate following response to comments.

Commenter	Section	Comment	Response
Peer Reviewer #7	Background	The authors present a strong case for PEHR functionality to improve quality and safety.	None needed
Peer Reviewer #7	Background	The list of priority areas from the 2007 AAP report match very closely to the actual priority domains within this brief, and later the authors describe the Model PEHR as exhaustive (and by extension exhausting) but do not describe where the Model PEHR improved the 2007 areas nor how the items in the 2007 report and HL7 and PEHR need to be assessed together to best identify the highest priority areas and details in need of further clarification. This is an essential part of this report and deserves further consideration.	In the background section, we do address the areas mentioned by the 2007 AAP report. In referenced Spooner 2012 (reference #45), very little progress was reported. We update that with current estimates of 31% from recent data.
Peer Reviewer #8	Background	The background provides good context for the importance of examining pediatric functionality in EHRs and its influence on care processes (work-flow) as well as health outcomes including safety and costs. Establishing key functionality desired in the pediatric EHR from the standpoint of multiple stakeholders is critically important.	Thank you
Public Reviewer (APTA)	Background	We have no specific comments to this section.	None needed

Commenter	Section	Comment	Response
Peer Reviewer #9	Background	The report provides an excellent statement of the problems and limitation of the Child EHR Format and why it is having limited impact on vendor products. The report appropriately describes the paralyzing impact of large numbers of child EHR requirements as well as the impact of meaningful use requirements in limiting the ability of vendors to implement these requirements. Focusing on the most important requirements identified by key informants and data from the literature on beneficial impact on practice are an important beginning to narrow the scope. Additional challenges that are not emphasized in the report come from the nature of the statements of functional requirements themselves that do not provide clear direction to vendors and a uniform implementation of the functional that can be validated through research. Some concepts such as “growth charts”, “immunization forecasting”, or “bright futures” have a clear paper based reality for practicing pediatricians, but their pathway to implementation in a computational form within an EHR is less clear to vendors. There are opportunities to clarify requirements and associate them with tools and data to support implementation. A growth chart is more than a plot of height and weight against age with a background image of percentile. Immunization forecasting involves both routine preferred schedules and computation of catch up immunizations. It must begin with a mapping between the actual dates of administration of specific vaccine products (coding according to standard developed and harmonized by both the CDC and the FDA) into number of valid doses of the component vaccine groups within a diverse range of combination products that offer alternative to immunize against a target disease.	Thank you for your comments and examples. If I may summarize, a basic requirement to implementation of pediatric-specific clinical decision support is that current recommendations and clinical guidelines be clear, actionable, and computable, which is often not the case. For example, an immunization requirement that dictates two months between doses would be clearer by indicating 28-days for computability. While this is definitely a problem in pediatrics, it is not necessarily specific to pediatrics in the general sense. As such, we have not added this to the background specifically, but we have increased our emphasis in particular pediatric-specific functionalities that may suffer from ambiguity, such as in the newly renamed “Routine Health Care Maintenance” section. As we discuss the implementation challenges in this section, we have specifically added a reference to the challenge of incorporating decision support for both acute as well as maintenance visits. Regarding the comment about making functional requirements clear and provide clear direction to venders, we now address this in GQ4 under the "Testability" section. We also hope that this document will help add to that clear direction to venders. Also, note that this report is part of a larger project to prioritize the functionalities for pediatric EHR's, as mentioned in our Next Steps section.

Commenter	Section	Comment	Response
		Clarification of the functional requirement as published by various organizations and association with key sources of data are an important part of the problem that this technical brief is addressing. Functional requirements as stated in prior documents are often vague, may have multiple pathways to implementation, and describe a range of different types of functionality. Typical "requirements" may be a data element to add to the EHR such as birth wt, gestational age, or head circumference; conversion of units or variable precision such as wt in kilograms or pounds and ounces; simple computed derived data such as BMI or medication dose in mg per kg per 24 hours; additional data from look-up and calculations such as height percentiles or multiple components of a combined vaccine; complex decision support such as vaccine forecasting; data visualization such as growth charts; or complex privacy and administrative functions required for complex guardianship, foster children, or adolescent privacy. "Requirements" vary greatly in their complexity and the approach of this technical brief is helpful to combine several components under single categories.	
Key Informant #1	Guiding Questions	No problems with the questions, only ask that they be answered more broadly.	None needed
Key Informant #1	Guiding Questions	School health is mentioned in question 2B, but all school health literature was excluded from the literature review.	This is a valid point, however while we excluded school health literature, we included by default pediatric care settings and their need to interact and communicate with schools.
Peer Reviewer #1	Guiding Questions	I have no further comments on this section	None needed
Peer Reviewer #2	Guiding Questions	The guiding questions are appropriate.	None needed
Peer Reviewer #4	Guiding Questions	I don't have any issue with the organization or content.	None needed

Commenter	Section	Comment	Response
Peer Reviewer #4	Guiding Questions	Privacy discussion is excellent. To program the EMR to provide the level of privacy recommended is very hard. Some of the privacy issues lie in the realm of policy with a practice as much as it is in the EMR. We have a long way to go in adolescent and young adult care and especially on the privacy issues. This report is a start to bring it "on the table" and start addressing how an EMR can be designed to support this need.	Thank you.
Peer Reviewer #4	Guiding Questions	The questions help organize the issues they wanted to address.	None needed
Peer Reviewer #5	Guiding Questions	CG1 seems to lack specificity - "identified in the literature and feature more prominently" - what does "feature" mean? What kind of literature? Does "improving children's health" include prevention or other therapies that might just maintain health?	The guiding questions were established a priori with input from key informants, AHRQ and CMS. Unfortunately, they cannot be changed at this point. They are somewhat general as this is a technical brief and not a systematic review.
Peer Reviewer #5	Guiding Questions	GQ2 - "pediatric primary care to adolescent care" is awkward, because primary care providers often take care of adolescents.	Thank you for this observation. In many clinics, there is a deliberate transition to an “adolescent visit” where the child has all or a portion of the visit in the absence of the parent. GQ2 attempts to provide guidance in functionalities related to that transition even if the child continues to see the same provider.
Peer Reviewer #5	Guiding Questions	GQ4 - I am not sure how this one question encapsulates dissemination and future developments - seems like this should be fleshed out more.	The guiding questions were established a priori with input from key informants, AHRQ and CMS. Unfortunately, they cannot be changed at this point. They are somewhat general as this is a technical brief and not a systematic review.
Peer Reviewer #5	Guiding Questions	The background describes that vendors were paralyzed by the overwhelming number of requirements. Is there any evidence that this was the case? I believe it to be true, in part, but children are often a neglected population -- little money can often be made by focusing on children.	This was a comment made by our key informants. We did not find any literature that specifically stated this.

Commenter	Section	Comment	Response
Peer Reviewer #6	Guiding Questions	I thought the guiding questions were OK, but it seemed like there was a lot of overlap in the discussions. It might have been better to choose key themes and report on them with the supportive evidence to improve readability - especially as this appears to be an evidence-informed qualitative study, although I know that the AHRQ way is to summarize the evidence based on the specific clinical questions.	The guiding questions were established a priori with input from key informants, AHRQ and CMS. Unfortunately, they cannot be changed at this point. They are somewhat general as this is a technical brief and not a systematic review.
Peer Reviewer #7	Guiding Questions	The four guiding questions seem very appropriate. If available, it would help readers better understand how qualitative information was obtained through additional questions/probing. For GQ2 – were the key informants asked about the potential opportunities or just barriers? GQ3. This question raises the issue of a need for definition of "pediatric" vs. "regular" EHR. As is pointed out in the brief the functional areas need to be considered by each domain. Would a generic EHR that does immunizations and growth well but fails on privacy, Bright Futures screening and counseling be considered a pediatric EHR? I think avoiding categorizing a product as a PEHR or not a PEHR and instead focusing no key functions that support the care of children will generally be more productive.	The guiding questions were established a priori with input from key informants, AHRQ and CMS. Unfortunately, they cannot be changed at this point. They are somewhat general as this is a technical brief and not a systematic review.
Peer Reviewer #8	Guiding Questions	The guiding questions were clearly stated and outline a thorough approach to this technical brief.	None needed

Commenter	Section	Comment	Response
Peer Reviewer #9	Guiding Questions	The four guiding questions are very appropriate and provide a useful structure for the report and have been well adapted to the specific concerns in pediatrics. GQ1 attempts to simplify and structure the large number of requirements in a few clearly understandable categories based on advice of the key informants. This is a critical first step to structure the report. GQ2 addresses the issue of context and helps to lay a foundation of why pediatric EHR should be different from adult EHR if it is going to be effective and acceptable to practitioners who care for children. GQ2A addresses important transitions that the pediatric EHR must support. GQ2B deals with workflow requirements for well child care that is often nearly half the activity of pediatricians. GQ2C addresses the challenges of implementation that begins with a clear understanding of what is required from vendors and practitioners to achieve the goals of each requirement considered in the report. GQ3 examines the evidence for benefits and includes quality, cost, safety, workflow, and provider satisfaction and is a critical part of separating pediatric EHR from adult products. GQ3B explores the connection between the functions and the outcomes and includes the important issue of involvement of patients and families. GQ4 explores testability and usability issues and challenges that impact dissemination and development of EHR to address the pediatric functions.	No response needed

Commenter	Section	Comment	Response
Key Informant #1	Methods	In reading the background and the purpose of the manuscript, I did not understand why you chose not to look at pediatric health care provided in non health care settings. A lot of health care goes on in schools and many if not most schools use EHRs. With the demonstration projects on HIEs with school systems and school nurses that use electronic health records, that lack of interest in the compatibility of those systems is confusing. So many of the mediations prescribed are delivered in schools. HIEs right now are allowing pediatric primary care providers to monitor student blood glucose monitoring from the clinic real time while the student is in school via the HIE - similarly for asthma and other chronic conditions.	We agree that pediatric care does take place in non-healthcare settings. However, it was necessary to limit the scope of this particular brief. We do mention that the pediatric EHR should interface with school systems with an exchange in the introduction to GQ1A. This functionality will help all pediatric providers to perform their work more efficiently.
Peer Reviewer #1	Methods	I have no further comments on this section	None needed
Peer Reviewer #2	Methods	Please describe any attempts that were made to directly obtain patient and family perspectives via key informant interviews.	The report was scoped as focusing on the role of the EHR for improving practice and clinical outcomes. Family perspective was an important dimension discussed by the Key Informants (KIs). However, because of the limited number of KIs allowed, we were unable to include a direct patient/family representative on the KI panel.
Peer Reviewer #2	Methods	Remove trailing semicolon	Done.
Peer Reviewer #2	Methods	The methods are adequately detailed for this technical brief.	None needed
Peer Reviewer #3	Methods	A conceptual framework should be developed and employed.	Conceptual frameworks are not typically done in the technical brief process and a conceptual framework was not a part of the protocol, but may be developed in the future.

Commenter	Section	Comment	Response
Peer Reviewer #3	Methods	A review of the key outcome literature (patient safety and quality outcomes in particular) to generate suggested EHR functionalities may also be helpful given the limited amount of available evidence. There may be concern that the available evidence has a systematic bias and that other functionalities may be more effective than those that have been studied to date.	Unfortunately, a full review of outcomes was outside the scope of this project although this is a good idea.
Peer Reviewer #3	Methods	Criterion for selection of key informants should be more clearly delineated as should the reason for the selected number of informants.	The Key Informants were selected to reflect a range of stakeholder perspectives; we are limited to no more than 9 by OMB policies. In addition to the information in Appendix B, we have added a brief statement to the methods section about the number of Key Informants.
Peer Reviewer #4	Methods	The methods were extensive consisting of multiple searches of the current literature and a listing of ongoing studies. By the time this report gets published more of the studies will be done. If any of them offer information that is not included in this initial effort, the report should be edited or an addendum added to bring this current.	As part of the process, we conducted an update during peer review. We have added a statement on the literature update to the Methods section of the report, in the Published Literature Search subsection.

Commenter	Section	Comment	Response
Peer Reviewer #5	Methods	A lot of this hinges on the key informants. How were these informants selected? Who did the 7 participants represent? The range of participants seems limited - most of the pediatricians are in academic settings. At least two are from the same institution. There is little geographic variability. Why was there only one primary care provider? It does not appear that there are any specialists? How many participated on the previous model EHR format project, that sounds like it was unsuccessful. It is doubtful that this group had significant variation of opinion - and it seems like a missed opportunity to really explore the issues.	The goals of the Technical Brief are to describe the state of the science and implications of the technology, summarize ongoing research, and comment on future research needs. The potential audience includes early adopting clinicians, patients, payers, policy makers, and researchers. The Technical Brief collects information from Key Informants and sources of gray literature to augment findings from published literature. In collaboration with local content experts, the EPC drafted a list of 20 potential Key Informants representing various perspectives including policymaker, researcher, and user. The team reviewed the list of potential Key Informants to include broad representation from the outpatient setting and community practice pediatricians, as well as individuals active in relevant ongoing projects. The list was vetted by Program Officers and a conflict of interest disclosure system and then prioritized to avoid overlapping perspectives. The EPC invited 10 individuals, 9 accepted. Of those, 7 were available to participate. Per the Office of Management and Budget (OMB) Paperwork Reduction Act, The EPC is limited to the inclusion of 9 or fewer Key Informants. We understand that this process and limit on the number of Key Informants limit the generalizability.
Peer Reviewer #6	Methods	I was surprised that for a key informant interview type of qualitative study that thematic analysis and continuation to saturation of ideas was not done. I was pleased that the AAP's EHR review site was mined as Grey Literature and thought that it would be fantastic if this was better referenced so that it could potentially be used by readers of the report.	The AAP has limited their review site to members so we cannot reference it further.

Commenter	Section	Comment	Response
Peer Reviewer #7	Methods	The methods are clear. Several questions came from this section. How were key informants selected? For example only one vendor was selected and there are upwards to 1000 in the country.	The Key Informants were selected by the EPC working with AHRQ to achieve the best representation we were able, given that we are limited by OMB regulations to a small number of individuals, and some invitees did not accept our invitation.
Peer Reviewer #7	Methods	Was there an attempt to contact more mainstream commercial vendors and they declined? Re: Literature review. The authors will be updating the review which is appropriate since at this reviewer knows of at least 3 in-progress projects that have concluded and resulted in publication. Re: Grey Literature, are there concerns that many EHR-based evaluations may not be registered with ClinicalTrials.gov? Where are the pediatric-specific EHR resources, programs, and projects that were identified located (pg 6, line 51)?	The Key Informants were selected by the EPC working with AHRQ to achieve the best representation we were able, given that we are limited by OMB regulations to a small number of individuals, and some invitees did not accept our invitation. Regarding the update, that has been done now. Regarding the grey literature, it is always a concern that trials may be missing and we did our best to identify them.
Peer Reviewer #8	Methods	The description of the methods is clear and concise and outlines how data from the various sources were collected and integrated. The author's adequately describe their approach to being thorough in terms of examining grey literature and alternate data sources (e.g. professional society websites).	No response needed.
Public Reviewer (APTA)	Methods	There is no mention of non-physician health services in this document, yet children especially those with some chronic conditions require services and resources of healthcare providers such as PT's, OT's and SLP's. There is a significant need to facilitate interprofessional collaboration and use of a core data set is essential.	We have revised the report to be more inclusive of a broader range of providers of children's healthcare.
Public Reviewer (Matt Elrod)	Methods	There is no mention of nonphysician health services in this document yet children especially those with some chronicconditions require services and resources of healthcare providers such as PTs, Ots, and SLPs. There is a significant need to facilitate interprofessional collaboration and use of a core data set is essential.	We have revised the report to be more inclusive of a broader range of providers of children's healthcare.

Commenter	Section	Comment	Response
Peer Reviewer #9	Methods	The methods used for this technical brief are solid and appropriate for gathering the data that is needed to address the guiding questions. The key informats were well selected and represent a broad range of investigators and experts in the field. The bibliography is comprehensive and the detailed search strategy and reasons for excluding publications in the appendices are very helpful. The inclusion of gray literature was effective. The search strategy might have been improved by expanding the search to include pediatric personal health records and patient portals since making parents aware of that their child has received appropriate care is an important part of the authorizing legislation for the child EHR format. The evolution of personal health records has increasingly focused on tethered approaches tied to data in an EHR hence the functionality of that EHR is the key determinant of the ability to support key pediatric personal health record functions. The policy statement of the American Academy of Pediatrics on personal health records and other papers in the limited literature on pediatric personal health records could have helped to inform the work of this technical brief. Personal health records can play an important role in transitions of care and work on the desired content of pediatric personal health records can inform what is needed in an EHR to support those transitions. Technical briefs must obviously limit their scope to achieve their goals, but the role of pediatric PHR could perhaps be acknowledged to note its exclusion and perhaps the need to explore this source of information in the future.	No response needed.
Key Informant #1	Findings	Appreciated the reference to line 54 page 19 for printing labels for dosages administered in school.	Thank you.

Commenter	Section	Comment	Response
Key Informant #1	Findings	Asthma Action Plans are not just needed for home - needed for day care, school, sports, band, ...	We agree
Key Informant #1	Findings	Expand the definition of transitions to the child's transitions outside of the acute care and primary care settings.	We agree that transitions and information exchange between other areas are important, but this type of information exchange is also important in the general adult setting as well, so we did not emphasize it. We do mention specialty care in the introduction to GQ2A. We mention health information exchange in the general sense, but transitions of care we mention are meant to be focused on pediatric-specific transitions.
Key Informant #1	Findings	I did not understand the statement in page 19, line 12 that "minimum range dose checks were of minimal value to the pediatrician". Why?	We have clarified this statement. It now reads, In a study of pediatric dose range checking, clinicians overrode under-dosing alerts much more frequently than overdosing alerts.
Peer Reviewer #1	Findings	"record systems" needs to be "medical record systems". Also of note on this section, among the difficulties in implementing privacy functions in the EMR, is that local administrators and IS personnel/developers are not familiar with this at all, hence, this adds a layer of complexity when seeking buy-in (locally) to build the functionality within the EMR.	Revised the statement "...make incorporation of privacy standards in record systems challenging." to "...make incorporation of privacy standards in medical record systems challenging."
Peer Reviewer #1	Findings	A good addition to this section would be this paper - (NISTIR 7865) A Human Factors Guide to Enhance EHR Usability of Critical User Interactions when Supporting Pediatric Patient Care	Thank you for your comment. We have referenced this paper in multiple sections.
Peer Reviewer #1	Findings	Also was this study performed in the inpatient settings?	We included studies that were performed in the inpatient center if it was clear that they applied to the outpatient setting as well.
Peer Reviewer #1	Findings	Also worthwhile to include the transition from adolescent to adulthood as an important EMR benefit; particularly for those kids with chronic diseases like cystic fibrosis, congenital heart disease, etc. This would be a great addition to Table 5 as well (page 27, lines 35-57).	We agree that this transition is an important potential EMR benefit, but to date there is little empirical evidence available.

Commenter	Section	Comment	Response
Peer Reviewer #1	Findings	Comment on this section, re: immunization registries, small peds practices would require higher activation energy for interacting with local IZ registries, no time to deal with technical issues; hence this function may not be implemented even if the provider wants it and the EMR can connect to registry.	No response needed. Thank you for your comment.
Peer Reviewer #1	Findings	comment: documentation compliance rules and policy also vary across care provider sites and payors. For example, there are "Clinical Documentation Improvement" (CDI) efforts in local institution to support better documentation for billing and reimbursement purposes. The CDI rules are sometimes troublesome due to local practices, in addition, existing EMRs are inflexible to support envisioned documentation workflow, leading to end-user extra work or work arounds, or dissatisfaction/non compliance. A discussion on "copy and paste" is probably warranted here as well; although it is convenient for documentation, a nightmare for compliance officers; can be a factor in fraudulent documentation or mindless documentation, increase "noise" in the documentation.	We agree about these pervasive issues. However, these are not necessarily pediatric-specific issues. CDI rules and “copy and paste” is a pervasive issue that informaticians need to address generally, not just for the pediatric-specific EHR.
Peer Reviewer #1	Findings	Hard to tell the size of the font for the heading in Page 9, lines 37 and 46.	The format of the report adheres to the AHRQ requirements for technical briefs.
Peer Reviewer #1	Findings	I noticed that the "User Perspective" section is prominent in all areas of document. This needs to be an overview provided either in the Intro or Overview section. This gives the reader an idea of what this section is about.	The purpose of these sections is now described more in the methods and we have changed the titles for clarity.
Peer Reviewer #1	Findings	In this section, I suggest that a statement about importance of vaccines in inpatient settings be included. I understand that the majority of care and vaccine management happens in the outpatient, but inpatient also has a role in this.	We agree; however, the focus of this review was outpatient care. To the extent that certain functionalities exist in both settings, we have described them, but with the focus being ultimately on implementation in outpatient care.

Commenter	Section	Comment	Response
Peer Reviewer #1	Findings	In this section, include CDS support for growth velocity, plotting mid-parental height, etc. This was mentioned towards the conclusion of paper but it is here where these functions needed to be discussed in detail.	We reference this functionality in the Pediatric-Specific Norms and Growth Charts subsection of the "Findings" of GQ1. It is still briefly mentioned in the summary and implications.
Peer Reviewer #1	Findings	In this section, include examples of other growth charts such as Turner's syndrome, etc.	We have added Turner's Syndrome as an example.
Peer Reviewer #1	Findings	In this section, you may want to add literature by LC Bailey's Multi-Institutional Sharing of Electronic Health Record Data to Assess Childhood; how EMRs can support norms for peds-specific conditions (i.e., childhood obesity).	This article seems to be quite relevant to the health information exchange domain. Although this functionality is important in pediatrics, it is also important in adults. We do include a section on obesity in GQ3, and we reference the need to include BMI for standard growth charts in GQ1 findings. Of note, there is an ongoing review of Health Information Exchange (HIE) to identify and synthesize evidence on the extent to which HIE is effective in improving a variety of outcomes and how the impact varies by different approaches to HIE. The report will also identify evidence on levels of use, and usability of HIE, as well as facilitators of and barriers to HIE. (http://effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?productid=1943&pageaction=displayproduct)
Peer Reviewer #1	Findings	It is not easy to determine the specific sections in this part of the report. Every heading is bolded and sections have the same font. In order to clearly delineate specific sections, I suggest that the headings be distinct. for example, on Page 9, line 8 - the "Vaccines" heading can be numbered so that readers can clearly distinguish that this is a specific section denoting a peds-specific function.	The format of the report adheres to the AHRQ requirements for technical briefs; however, we have itemized the functionalities for GQ1 and added the following statement: " The following section will address specific information for: 1) vaccines; 2) routine health care maintenance; 3) family dynamics; 4) privacy; 5) managing pediatric conditions in vulnerable populations; 6) mediations; 7) documentation and billing; and 8) pediatric-specific norms and growth charts. " to GQ1.

Commenter	Section	Comment	Response
Peer Reviewer #1	Findings	It would be better if somehow the report can provide an idea of this can be implemented. For example - this paper by FC Bourgeois - Whose personal control? Creating private, personally controlled health records for pediatric and adolescent patients; shows how one might implement adolescent privacy. Also, it should also be noted that this line is not specific to pediatrics.	Thank you for the suggestion. We have included a reference to this article.
Peer Reviewer #1	Findings	Not peds-specific issue	The incorporation of QI generally into workflow is indeed not pediatric specific. However, we are discussing pediatric specific QI measures.
Peer Reviewer #1	Findings	One reason why there is a dearth of evidence for peds-specific benefits is the rate of adoption of EMRs among pediatricians. Perhaps the delay in adoption by ambulatory practices contributed to the lack of studies. On the other hand, children's hospitals (academic centers) have been at the forefront of EMr adoption and they can be a good source of EMR studies specific to peds. Literature by M Nakamura - Electronic health record adoption by children's hospitals in the United States (archives) and Change in adoption of electronic health records by US children's hospitals (pediatrics) would be a good source of info.	Thank you for your comment. We do address this in our "background" section and have referred to the "Change in adoption…" article in this section.
Peer Reviewer #1	Findings	re: 70% failure rate of HIT implementation... although this is widely known among HIT practitioners, this paper will need to have a reference for this statement.	Thank you for your comment. We have attempted to find solid references to this often-quoted number, and we were unable to find direct evidence of this high of a failure rate. As such, we have removed the specific numerical reference of "70%" and have replaced it with "a significant likelihood of failure." The following references were relevant: CHAOS Manifesto (2013); Think Big, Act Small from The Standish Group International (2013); and Business Analysis Benchmark: The Impact of Business Requirements on the Success of Technology Projects. IAG Consulting (2009). However, since these sources did not directly support the 70% failure rate statement with clear evidence, we opted to minimize the statement.

Commenter	Section	Comment	Response
Peer Reviewer #1	Findings	re: usability, EMR usability if NOT a peds-specific issue, adults suffer the same fate. This generalized problem of EMR usability is an industry problem (still immature), likely due to the lack of best practices in EMR design and workflow support.	We have added a comment.
Peer Reviewer #1	Findings	Sentence that starts with "Implied seem the notion that..." does not make sense. Please revise and clarify.	We have revised that sentence for clarity.
Peer Reviewer #1	Findings	This line assumes that reader knows what HIE is and its current state of adoption. Perhaps a few lines providing info on HIE and level of adoption in the country. HIMSS would be a good resource for this info.	Thank you. We have added a reference to the HIMSS definition of HIE.
Peer Reviewer #1	Findings	This paragraph needs to be a continuation of the paragraph before it. Does not make sense to separate the two sections.	Thank you. These paragraphs have been revised and moved to the implementation challenges section in the report.
Peer Reviewer #1	Findings	This section is a statement of EMR functions, whereas other sections are presented as challenges or constraints. The section should be revised to represent implementation challenges.	Thank you. We have revised this section to discuss challenges related to implementation for vulnerable populations.
Peer Reviewer #1	Findings	This sentence was presented in "quotes" in page 48. This statement must be consistent throughout the paper. For this section, it only shared challenges with growth charts, equally, this section must also share challenges with implementing physiologic norms in EMRs.	Thank you. The statement has been removed from this section and we have revised the text for this section.
Peer Reviewer #1	Findings	Typo after "website". Remove the "comma".	We have deleted the comma after "website" to correct the sentence.
Peer Reviewer #1	Findings	What about neonatal screening? This is a relevant functionality in age-based transitions that can be supported by EMRs.	We agree that newborn screening is important and have thus expanded our inclusion of this topic in the "Age-based transitions" section. We inserted text to address this issue.

Commenter	Section	Comment	Response
Peer Reviewer #2	Findings	I am unclear how the rarity of conditions included on the newborn screen affects the importance of capturing structured data. Presumably the authors intend to communicate that structured data capture for rare conditions is especially important (i.e. to support automated decision support and other disease management tools), but this point is somewhat lost in the current wording of this paragraph.	Thank you for your comment. We have reworded the paragraph to emphasize the importance of laboratory data with interpretation displayed clearly along with decision support for the primary provider.
Peer Reviewer #2	Findings	"making up data:" This rings as untrue and presents vendors in an unfavorable light. If an EHR vendor digitizes a growth chart that has questionable validity (e.g. "asian growth charts"), they are not "making up" the data, but rather copying data of questionable validity that someone else may have "made up." As written, this appears to blame vendors for trying to satisfy user requests. However, I agree it is appropriate for authors who publish disease specific growth charts to follow the highest in standards of data collection (e.g. those followed by WHO). Also, I think many pediatricians are confused about "descriptive" growth charts (describing the growth pattern of a diseased population), vs. a "prescriptive" growth chart that reports the ideal growth pattern (e.g. the WHO growth charts). It is the role of guideline authors and professional organizations to better educate pediatricians about the appropriate use of growth charts. I suggest re-framing this paragraph to more clearly indicate that by asking vendors for features not based in good evidence, we (the pediatricians) are creating a problem.	Thank you for your comment. We have rewritten this section.
Peer Reviewer #2	Findings	"writ large" – is this a typo?	Thank you. We have replaced "writ large" with "overall".

Commenter	Section	Comment	Response
Peer Reviewer #2	Findings	A minor point: since software developers will read this document, throughout this section be sure the term "development" unambiguously refers to child development rather than software development.	Thank you. We have clarified child development throughout the report.
Peer Reviewer #2	Findings	Although not specific to pediatrics, and a bit broader than usability, it may be worth citing some articles on sociotechnical considerations (e.g. Sittig and Singh 2010, "A New Socio-technical Model for Studying Health Information Technology in Complex Adaptive Healthcare Systems") and the "Better EHR" materials (edited by Zhang and Walji https://sbmi.uth.edu/nccd/better-ehr).	This is an interesting idea but out of scope for this particular project.
Peer Reviewer #2	Findings	An additional challenge is some developmental and behavioral screening tools are paper-based and subject to licensing agreements that have not been updated for electronic use. Regarding the non-actionable items (e.g. "avoiding risk taking situations"): this seems a little out of context. Consider reframing "development" as "development and anticipatory guidance" to make it clear that the focus extends beyond developmental surveillance, screening and referral.	Thank you for your comment. We added a reference to note that these are licensed products. We moved the examples into the "Implementation Challenges" section.
Peer Reviewer #2	Findings	As currently written it implies vendors don't need to implement growth charts/reference norms for specific populations. However, well-validated reference data are increasingly available. I think this is one area where a strong action statement can be made for EHR vendors. I suggest re-writing this paragraph to make it clear that vendors must implement the well-validated reference data that are available (e.g. the world health organization growth charts—including growth velocity data—and potentially the new Fenton birth measurement charts).	Thank you for your comment. We have significantly reworded this section to encourage venders to include available growth charts while also placing the onus on clinicians and researchers for developing and validating growth charts.

Commenter	Section	Comment	Response
Peer Reviewer #2	Findings	As currently written, I think the recommendation that clinicians should refer adolescents to another clinician if they have a faulty EHR (i.e. lacking in adolescent specific confidentiality features) is a little hyperbolic.	Thank you for your comment. We have removed the reference from the age-based transitions section, allowing the "Privacy" section to address these issues more thoroughly.
Peer Reviewer #2	Findings	As noted by the authors in various places, an additional challenge relevant here is that guidelines of care for specific subpopulations are often not written with EHR implementation in mind. Consequently they may lack clear definitions of who should receive what services. Also, guidelines change over time and maintenance is a challenge.	No response needed
Peer Reviewer #2	Findings	change word order to: "customized surveillance milestones"	We have revised to "...customized surveillance milestones."
Peer Reviewer #2	Findings	Clarify "controller medications" as "asthma controller medications"	Done.
Peer Reviewer #2	Findings	consider replacing "clinical outcomes" with "process outcomes"	Thank you for the suggestion. We have reviewed our two uses of "clinical outcomes." The first we have kept as "clinical," the second we updated to "process," as it refers to the process of whether or not someone was vaccinated.
Peer Reviewer #2	Findings	How are issues of confidentiality and consent for adoptive parents and legal guardians different from birth parents with custody? If the concern relates to preventing access by birth parents that have lost custody then please re-write this sentence to make that clear. Or does the concern relate to informal caregiver arrangements?	Thank you for the comment. We agree that the issues with 'adoptive parents' are not nearly as difficult as those for stepparents, foster care providers, and guardians; although, there could still be some issues with the transition of care to the new parents, especially with receiving past medical records or genetic records. We have removed 'adoptive parents' from this section.
Peer Reviewer #2	Findings	How is "physician job satisfaction" an important consideration related to patient lists? If they are more satisfied because this feature makes them more effective in caring for ill children in their practice then I suggest highlighting the patient benefit rather than physician satisfaction.	Thank you for your comment. You are correct, in that there is likely little need to include this seemingly editorial comment. Our primary interest is better care for children, and we hope that this results in higher job satisfaction for all who care for children. The comment has been removed.

Commenter	Section	Comment	Response
Peer Reviewer #2	Findings	I suggest giving a concrete example of a “complex contraindication” to help make this issue more clear. Variability in dosing is readily obvious from the variability in weight, but it is not clear how this relates to contraindications.	Thank you for your comment. We have clarified our wording to focus on the "complexities" of pediatric medication dosing as opposed to any contraindications. There could be contraindications to using a specific dosing strategy, such as when using weight-based dosing in an adult-sized pediatric patient would result in an overdose.
Peer Reviewer #2	Findings	I suggest that another challenge worthy of mention is the frequently changing recommendations. For example, there have been significant changes in recommendations regarding the need for a second dose of flu vaccine almost every year since the H1N1 pandemic.	Thank you. There are certainly many challenges, and changing recommendations is one. Ideally, an EMR would facilitate responsiveness to such changes.
Peer Reviewer #2	Findings	I think variability in privacy requirements for teens between states can also create implementation challenges.	No response needed
Peer Reviewer #2	Findings	If there were any mentions among the key informants of the need for direct links between the charts of siblings I would include that here (i.e. ability to click on a link to open a sibling’s chart). This is a commonly requested feature in our health system. A potentially unique feature of the pediatric setting is that parents often want to discuss the health of their other children during office visits and telephone encounters. As a side note, in this reviewers experience, these linkages also are requested by health service researchers to include family structure information in their analyses.	Thank you for your comments. Our KI's did mention the importance of linking between family members in an EHR. We have modified this section to include a stronger reference to that requested functionality.
Peer Reviewer #2	Findings	If users repeatedly made comments regarding “features to keep information private from parents and other providers,” why were these comments not “abstracted” for the purposes of this report?	This section is a summary of comments found in the AAP User Website as noted in the report. The summary is meant to capture ideas presented, but not fully extract all comments, as this was outside the scope.
Peer Reviewer #2	Findings	Make sure past tense is used consistently (replace “are” with “were”).	Done.
Peer Reviewer #2	Findings	Missing noun: “to non-sensitive [information].”	We have inserted "information" so the statement now reads, "...allowing access to non-sensitive information."

Commenter	Section	Comment	Response
Peer Reviewer #2	Findings	Move the comment about developmental questions to the user perspective paragraph in the development section earlier in the report.	We have removed this reference from the “clinical subpopulations” section.
Peer Reviewer #2	Findings	Please cite the AAP policy statement regarding CDC and WHO growth charts.	We have added information regarding the difference between the WHO and CDC (standard vs reference), but dictating which to use is outside the scope of this brief.
Peer Reviewer #2	Findings	Privacy requirements can also vary by state of residence.	Correct. We have now emphasized ‘unique local laws’ in the privacy section.
Peer Reviewer #2	Findings	Reference data: the availability of reference data for growth charts seems to be a somewhat different issue than the main point of this paragraph (ability to implement guideline based care related to child development such as the Bright Futures content). I suggest discussing issues related to reference data in a separate paragraph. Also, many reference data sets are now publicly available (e.g. for growth and blood pressures). My worry, as noted later by the authors, is that EHR vendors may be unwilling to go to the effort to obtain these data since they tend to be scattered among multiple sources (CDC, WHO and various publications).	Thank you for your comment. We agree that this sentence may be misplaced, and we do address this topic later in the pediatric norms and growth charts section. We have removed this sentence from the report, leaving the "pediatric norms and growth charts" section to address the issue in more detail.

Commenter	Section	Comment	Response
Peer Reviewer #2	Findings	Referral of adolescents has been done for many years in part for confidentiality reasons unrelated to the EHR (e.g. anonymous HIV testing and free family planning services). Is there any supporting evidence besides the committee opinion that clinicians do (or should) transfer the care of children to someone with a better EHR (or, implicitly, one without an EHR)? As noted in a previous section there are many ways that the confidentiality of a patient is at risk besides the EHR, and clinicians have evolved ways to protect the confidentiality of their patients within the systems they have (whether it is paper-based or electronic). If the OB/Gyn committee was speaking only about family planning services in their recommendation to refer patients due to EHRs with inadequate confidentiality features, then make that clear. Also, acknowledge that confidentiality issues beyond the EHR also drive the decision to refer (e.g. itemized explanation of benefits sent to parents).	Thank you for your comment. This particular reference had previously been contained in the age-based transitions section. After further review, we have removed the specific "refer" patient wording from this section in favor of the more thorough review in the "privacy" section. We also specifically identify the explanation of benefits as being a potential breach area in "Table 2. Potential breaches of confidentiality during a medical visit."
Peer Reviewer #2	Findings	remove the word "now." Frequent visits and immunizations have been the norm for many years.	Done.
Peer Reviewer #2	Findings	Remove the word "simply." This is not a simple problem	Done.
Peer Reviewer #2	Findings	Replace PVX (shortened brand name for Pneumovax I assume) with PPV (generic name) and expand the abbreviation in the table footnote (pneumococcal polysaccharide vaccine).	Thank you for the suggestion. We use the name of the vaccine that was used and reported by the study authors.

Commenter	Section	Comment	Response
Peer Reviewer #2	Findings	Since single antigen Mumps, Measles and Rubella products are generally no longer available; MMR may not be the best example of a combination vaccine in this era. I suggest including an example of a newer combination product such as DTaP – IPV – Hib (or other suitable product that was mentioned by the informants). Such an example more clearly elucidates the challenge in managing combination products that may or may not be available in individual pediatric offices.	Thank you. We have updated the example to this one.
Peer Reviewer #2	Findings	spell out “body surface area”	Done.
Peer Reviewer #2	Findings	The current sentence has 2 different meanings. I suggest splitting this sentence so that parenteral nutrition is in a separate sentence from “compounding medications.” Currently the sentence can be easily misread as “mixing medications in TPN is complicated” rather than “TPN is the most complex compounded medication”	Thank you for the comment. We have added a comma and clarified the wording to be more clear.
Peer Reviewer #2	Findings	There appears to be a mistake somewhere in this sentence (second sentence of paragraph, beginning “For these guiding questions…”). I cannot quite figure out the intended meaning of this sentence.	We have revised the sentence to be more clear.
Peer Reviewer #2	Findings	There is some emerging evidence that tracking development via an EHR improves early intervention referral rates (a process outcome)	No response needed
Peer Reviewer #2	Findings	These paragraphs imply the authors concluded that EHR vendors should not address Bright Futures content other than the 52 actionable items. If this was not intended please consider revising these paragraphs.	Thank you for your comment. Correct, this was not our intent. We have decided to remove some of the details from this description section and have instead broadened our coverage of the Bright Futures actionable items in the "Implementation Challenges" section.
Peer Reviewer #2	Findings	What is meant by the statement “alternative growth charts do not exist?” They certainly do exist, but may have been haphazardly validated.	Thank you for the comment. We have updated our wording to make this distinction more clear.

Commenter	Section	Comment	Response
Peer Reviewer #3	Findings	Recommend expansion of the ongoing research section in GQ3.	Thank you for your comment. We have taken this into consideration. We do believe that we identify the relative scarcity of studies in several areas throughout the brief.
Peer Reviewer #3	Findings	The emphasis on vaccinations and on family/social dynamics seems a bit too strong.	The emphasis reflects the availability of literature and the emphasis of our key informants.
Peer Reviewer #4	Findings	I would not dismiss the Model Pediatric EHR as too extensive. Granted there were parts that were ahead of the technology at the time. I look at it as recommendations to strive to achieve. The vendors should do a Gap analysis with their current functionality and what is recommended in the Model Pediatric EHR to plan their ongoing development. As I reviewed it as a practicing pediatrician I wished my EMR could do that.	Thank you for your comment. We have reworded this section to emphasize that the format identifies desired functions but that venders may have felt they were unable to implement them, especially with the urgency of MU requirements.
Peer Reviewer #5	Findings	The findings are comprehensive. However, they fit very closely with the model EHR findings. It is not clear if this process focused the requirements to a minimal critical set. If so, it might be important to have a separate section within the findings clarifying what those are.	This technical brief will be used in a broader process to focus the recommendations. The brief itself is simply intended to describe the current state of science in the area as a foundation for more directed work.
Peer Reviewer #6	Findings	As I recall from one of those workgroups, there was also an issue in that different locations may have different requirements for vaccine forecasting logic. Bill Adams at Boston University would know more about this area	We don't go into detail on vaccine forecasting, although we do reference flexibility in forecasting based on local requirements under the 'immunization status' header.
Peer Reviewer #6	Findings	at our hospital, we do keep psychiatric records in our EHR restricted access, and certainly there is the issue with EHRs concerning suspected or confirmed child abuse documentation and the relationship to discovery.	No response needed.
Peer Reviewer #6	Findings	certainly it has been helpful to be able to have shared family history. I think this is really a small tip of the iceberg in that complex patients and/or foster care patients need to have a portable longitudinal record so that transitions of care can happen more seamlessly.	No response needed

Commenter	Section	Comment	Response
Peer Reviewer #6	Findings	I felt that this page could use some work. Pediatric quality measures have been difficult to determine and to apply on a global basis. I do agree that interventions should fit into clinician workflow with a minimum of disruption - otherwise they may not be used unless the perceived benefit is sufficiently high. I wonder if there is anything in the pediatric patient safety literature - I think that something that could be covered is the appropriate delivery of medications and medication education in a patient / family supportive manner to try and reduce the large number of outpatient medication errors.	We agree that medication prescribing has some areas that can be improved (e.g. indication-based dosing), but there is little that is specifically pediatric-specific.
Peer Reviewer #6	Findings	I think that a validated means for tracking development, which can be easily administered (and possibly family-administered) should facilitate appropriate referral to Birth-to-three programs. I believe there was a study to that effect but it didn't seem it was cited. One recent study was "Improving developmental screening documentation and referral completion." They state that with their program, referrals to Early Intervention increased from 13% at baseline to 43% with phone follow-up and 39% post.	No response needed.
Peer Reviewer #6	Findings	I thought the medication section was pretty good, although I would state that we do also know that for certain high risk medications, that clinical decision support safeguards should be built to ensure correct usage (e.g. epinephrine, insulin) and that future work includes ensuring correct dosing for some of our patients most vulnerable to ordering error (e.g. NICU, morbidly obese). This is definitely an area where CPOE has unintended consequences which would be astronomically unlikely otherwise (e.g. picking amiodarone instead of amoxicillin because they appear next to each other alphabetically).	Thank you for your comments. We have modified our wording of this section to help emphasize the concern of dosing errors in our vulnerable population. We agree about safeguards surrounding epinephrine, insulin and other medications like amiodarone/amoxicillin. However, we do not feel that these are pediatric-specific concerns, as the same warnings should apply to ordering these medications for adults as well. Of course, the dosing scheme and regularity of use of these medications might be different in our population as opposed to adults.

Commenter	Section	Comment	Response
Peer Reviewer #6	Findings	I would say that vaccine forecasting is helpful for routine vaccinations, but really really helpful for determining catch up immunizations. I was surprised that there was not mention of reminder systems with vaccinations, this area is well studied and as I recall, electronic reminders can improve vaccination rates (or at least developmental screening) substantially [It does look like there were many more references in GQ3A/GQ3B]. From a practical viewpoint, it would simplify things substantially for pediatricians to have electronic vaccination schedules because these must be sent to daycares, preschools, and schools frequently. It should be a strategic goal for the AAP/CDC to provide the vaccination logic so that we can have an easily updatable, national standard for vaccination schedules - however, we are far from that goal today.	Thank you for your comment. We agree with you about the importance of vaccine reminders and electronic immunization records. We do address electronic formats in the "Vaccines Functionality" section, and we have now added a sentence that emphasizes the success of immunization reminders that appear in a clinician's workflow.
Peer Reviewer #6	Findings	I'd say that there are some pediatric historical and physical exam findings that are slightly different in emphasis than for adults. For example we routinely ask about sick contacts, pets, travel - it seems we see more zoonotic disease, or exposures with our youngest (e.g. botulism), or suspected child abuse and neglect which might not be so prevalent in adults. HPI is probably different also (e.g. less emphasis on things like chest pain). Child abuse and neglect and interactions with child protective services are probably more unique to pediatrics and the pediatrician's role as patient advocate.	No response needed.
Peer Reviewer #6	Findings	In general I thought the Implementation Challenges area could use more work and/or key informant interviews.	Thank you for your comment. Due to EPC guidelines, we are unable to request additional information or input from our Key Informants. We attempted to identify challenges that surfaced, and we have revised several of these sections.
Peer Reviewer #6	Findings	The pediatric norms/growth charts area is well done.	No response needed

Commenter	Section	Comment	Response
Peer Reviewer #6	Findings	There are a lot of medical conditions that benefit from clinical decision support/pathway management: Here at Seattle Children's, we have created evidence-based clinical pathways for roughly 50 pediatric medical conditions. To the extent that these clinical decision supports can be adapted to different local environments and a repository of pediatric clinical decision supports can be made available, we should be able to work together to catalyze best practices across the nation, instead of having silos in every hospital practicing care which is highly variable between (and sometimes even within) pediatric health care institutions. I would distinguish this as a type of CPOE that is not specific to medications.	Thank you for your comment. We refer to CDS extensively during the brief, often entirely separate from medication prescribing. To better reflect the content of this section, we have removed CPOE from its heading.
Peer Reviewer #7	Findings	Additional consideration for the vital role of percentiles may be worth adding. I may have missed it but in many EHRs percentiles are not calculated but only available visually. They need to be available in both formats for reporting and care. These calculations are fairly easy to implement but vendors may not prioritize this in their work.	Thank you for your comment. We did include that as item 4 in the bulleted list. It probably does deserve more highlight, though, as that should be a basic functionality of the growth chart. We have reordered it to be item one in the list.
Peer Reviewer #7	Findings	All EHRs need to support interoperability but the actual information (content) needed for children may be different than adults. A suggestion would be to move some of this material to the Development/Health Maintenance Section and target traditional transitions in this section with a special focus on unique pediatric functions (and possible content) for common conditions.	Thank you. We have moved this statement to the routine health care maintenance section.
Peer Reviewer #7	Findings	Can this section be combined with the earlier Testability or are the different sections?	This seems like an appropriate restructuring. We have merged these sections.

Commenter	Section	Comment	Response
Peer Reviewer #7	Findings	Highlighting the need to tailor system design to the unique workflow of child health clinicians is important.	We agree. This comment speaks to the importance of user-centered design, which is specifically mentioned in the "Summary and Implementations" section and is alluded to in many sections where we emphasize the importance of creating systems that incorporate into the clinician workflow.
Peer Reviewer #7	Findings	I would encourage the authors to use a different phrase than “and this is not yet happening.” There are many examples of strong pediatric functionality in limited areas. The issues might more constructively be thought of in terms of spread/diffusion. If indeed it is not yet happening listing more detail on the evidence for this observation would be helpful. Several of the examples listed in this section are quite generalizable to adults and information sharing more generally. Similar comments could be made with regard to workflow and customization.	We added the word “consistently” to help distinguish between general incorporation of functionality and specific instances of functionality.
Peer Reviewer #7	Findings	Important points but no discussion of dissemination or future research.	No response needed
Peer Reviewer #7	Findings	In this section there are important descriptions of billing challenges related to usability and design but none that are specific to children. Perhaps there are examples of where vendors or site-based designers leave out important codes, but in the end this is more about content/configuration than a unique feature.	None needed
Peer Reviewer #7	Findings	Multiple excellent points but a lack of actual proposed solutions. Do we know what to ask for in this area in a way that vendors could implement or are we still scoping out the problem. This question has been around since 2007 – are there examples of progress or implemented solutions?	The literature did not reveal significant examples of progress or implemented solutions, although we know several do exist. For the scope of this brief, we are not to make recommendations but only to report on those that exist.
Peer Reviewer #7	Findings	Several important points noted.	None needed

Commenter	Section	Comment	Response
Peer Reviewer #7	Findings	The authors describe well the importance and challenges of identity with regards to children.	Thank you
Peer Reviewer #7	Findings	The authors do an excellent job of outlining the special requirements for children and the value of weight-based dosing.	Thank you
Peer Reviewer #7	Findings	The authors highlight this area appropriately and tracking milestones is one way to do this. There are also multiple structured screening forms as well that do not require tracking but are recommended (and in some states required) by some payers (Medicaid). Bright Futures, however, is a guideline (with acknowledged limitations on evidence and actionably) that includes much more then Development. I think the authors need to consider thinking more specifically about the domains of “Routine Health Care Maintenance” (i.e. the Well Child Visit) or at least acknowledge that Developmental screening is only one area of RHCM. Physical Development (the Physical Exam) is also not generally included under Development either, nor is summary of guidance, other screening activities, etc. This gets back to the difference between function and content. All EHRs can ask questions, record answers, summarize scores, and print letters/forms but the specific requirements/content for children is quite different than that required for care of adults. Another example would be the “After Visit Summary” a generic one used for adult care would look quite different than that used for a health child.	Thank you for these comments. We agree with you that the section previously labeled "development" really needs to address the entire childhood routine health care maintenance visit. We have updated the heading to reflect that. We have also rewritten major portions of this section to address the many facets of the RHCM visit.

Commenter	Section	Comment	Response
Peer Reviewer #7	Findings	The authors point out that little is known about many issues related to usability and workflow. This area, however, seems too short for its importance. The delivery of ambulatory pediatrics preventive care is a high-volume, complex activity (as pointed out in the next section). Access to both clear, simple data summaries (immunizations, growth, screening (current and past), etc) as well as decision support is essential. Limiting the content to those items that are recommended by either experts or evidence is also critical but at the same time even this content is too extensive to include in its entirety. I think the authors need to explore more deeply this section and try to find examples of efficiencies unique to pediatric well visits (I know of one study that showed that printing school forms saved nurses from having to hand write 100,000 dates in one year and freed a nurse from "form duty"). I think the authors might also consider looking at what clinicians dislike about EHRs and how high volume settings require tailored designs. Also, the discussion of quality indicators in this section seems out of place. Designing systems to be able to accurately measure quality metrics is essential but this reviewer is less convinced that integrating quality reporting into clinical workflows is an essential PEHR function.	This Technical brief was not designed to look at how functionality is to be implemented but what functionality. While we agree with the sentiment, this extends into issues related to design conforming with high volume patient environments. In regards to school forms, this item was included in the report as a desired functionality in conjunction with vaccines. We made a modification regarding school forms in the section on documentation.
Peer Reviewer #7	Findings	The authors point out that there needs to be a balance between documentation and efficiency – this is very important to high-volume clinical care.	No response needed.

Commenter	Section	Comment	Response
Peer Reviewer #7	Findings	The authors provide evidence that this is a uniquely important area for children. One area that is not described, however, is the relatively simply requirement to provide a clear, central representation of an immunization history by series (not universally available) and the need to display multi-component (DTaP, IPV, HepB) immunization dates within each series. Combo immunization are generally not used for adults. Even the EHR used by over half the country does not do this. But it is the way that most clinicians think about immunization histories and the way that ACIP guidelines display data. The opportunities for clinical decision support are well described.	Thank you for your comment. This is a good feature that seems obvious to those of us who work with children and vaccine records daily, but it is clearly not obvious to EHR designers. We have added a sentence specifying this feature.
Peer Reviewer #7	Findings	The authors provide excellent support for the importance of transitions, however, this reader was confused regarding the the combining of core pediatric age-based transitions (fetal to newborn, newborn to childhood, etc) and team-based transitions (pediatrics to internal medicine). I think setting up this section and acknowledging that currently "Transitions" are mostly between care teams (pediatrician to Internist, outpatient and inpatient) rather than developmental within a team (across the pediatric continuum – supported by Bright Futures and other guidelines). Focusing on what key elements are unique to children and including them in portable data summaries (caregivers, child-specific past history, immunizations) would be helpful.	Thank you for your comment. We have updated the wording of this section to make the organization more clear.

Commenter	Section	Comment	Response
Peer Reviewer #7	Findings	the authors say that there is no supportive literature related to utility yet in the previous section provide an extensive literature review that includes many interventions viewed as successful and a smaller number associated with high provider satisfaction. A bit more detail clarifying why these studies do not support the usefulness of the PEHR would be helpful. Also, dissemination of what we know works and future work that will develop and test new areas are quite different and could be described as such.	While there are reports of individual studies provided in this technical brief, the quality and number of studies available do not meet the standards to consider there to be adequate evidence to do a full systematic review. It is true that there are interesting individual studies with promising data; these need to be expanded and replicated.
Peer Reviewer #7	Findings	There has been a tremendous amount of work in measure development that is lightly represented. Depending on space, I think adding content in this area would be helpful. Extensive measure sets are being developed but it is unclear how best to use them and/or whether to require their use. Picking/prioritizing the most important ones seems very important to this reviewer.	We agree that this is very important and is part of a larger effort that includes this technical brief. That activity, however, was not the role of this brief.
Peer Reviewer #7	Findings	This area is critical and under developed in this report. Throughout the document the author's reference activities in academia, practice, professional societies, and vendors and the discussion could be brought together in this section. In particular focusing on how the continuum from evidence to guideline to recommendation to implementation relies on well specified, evidence-based content. More detail from the key informants on what is happening now that is successful, whether any have been implemented and how informants said this should proceed going forward would be helpful.	Thank you for your comments. This would be an excellent discussion to have. Unfortunately, our process does not allow us to return to our key informants for further information.
Peer Reviewer #7	Findings	This is a critically important section since it is the best description of "unmet-need" and "highest priority" areas.	We agree. We have focused much of our effort on expounding on this section.

Commenter	Section	Comment	Response
Peer Reviewer #7	Findings	This is very important. If possible it would be great to include any evidence that we have that MU has led to improved Pediatric Functionality.	Recent literature has reported on accuracy of vaccine registries, but otherwise, specific evidence is lacking at the time of this report.
Peer Reviewer #7	Findings	This is well described and critical for children.	None needed
Peer Reviewer #7	Findings	This reviewer knows of several publications that have described the critical need for shared testing environments for immunizations to compare results of decision support. This is especially feasible in the age of web-services and could be mentioned as a success example.	Thank you for the comment. We do use the immunization example as a success story for testability in section GQ4.
Peer Reviewer #7	Findings	This section is also very important and does focus on two critical groups: vendors and providers. Multiple important issues are identified. However, in the vaccine section, no mention is made of interoperability with immunization registries nor the huge progress being made nationally in this area. In addition there is no discussion of processes that bring clinicians, vendors, and families together. Rather than describing challenges by section the authors might consider describing them by themes including: lack of standards and specifications (Bright Futures), lack of resources (standards exist but no will on part of vendor), lack of local expertise (standards present and EHR supports implementation but local configuration is required and can't be done) with specific examples across the domains. This section concludes with "we do not have the ability to make up standards" but this report certainly could point out the critical need for others to do it and outline the 3- 4 highest priority areas.	While we agree that there are certain data that are more important to be exchangeable in pediatrics, interoperability is not a pediatric specific issue and should be addressed on a level including all patients (example MU efforts). We appreciate the suggestion to redesign the layout and focus on themes instead of areas pertaining to specific health care tasks. However, this would diminish the desire to focus on functionalities related to pediatric care workflow and processes.

Commenter	Section	Comment	Response
Peer Reviewer #7	Findings	This section was initially confusing because I was expecting management of medical conditions but ended up reading about additionally vulnerable groups and/or populations at-risk based on social/economic adversity. Setting this up better would be helpful. Perhaps acknowledging that all populations will benefit from care management, tracking, and outreach and that while parents will play a unique role in this it is not unique to pediatrics. However targeting populations of children in need of additional tracking/outreach does warrant special attention. Pg 16 line 50 – the statement that children with chronic disease offer unique challenges that can only be achieved by unique pediatric functionality needs to be supported with some examples. As stated this would be true for any chronic illness (adult or child). IN the section "Managing a Clinical Subpopulation" these same comments are relevant.	We have changed the title and added a lead in sentence to make this section clearer.
Peer Reviewer #7	Findings	What items in the AHRQ review were unique to pediatrics and/or which functions were important to everyone but more important to pediatricians?	The report mentions complexity specific to pediatrics, much corresponding to what we discussed in our own findings. Specific pediatric workflow issues were not specifically defined, although additional research was recommended.
Peer Reviewer #8	Findings	The report organization by guiding question and key themes works well. However, the report reads as if different authors wrote different sections and there should be an attempt to unify the writing style across the report. The findings for guiding questions 1 and 2 are clear and well written. The same can not be said for the presentations of findings related to guiding questions 3 and 4. The clarity and quality of the writing in the sections addressing GQ #3 and #4 need attention. A careful read through and editing of these sections would reduce the number of unclear and poorly written sentences.	We have edited the report.

Commenter	Section	Comment	Response
Peer Reviewer #8	Findings	While the findings hint in a couple of places that Meaningful Use is driving the development of EHR functionality, the authors do not address how this might be counter-productive for the pediatric EHR given the limited scope of MU. They also do not offer any insight on how to address this issue given what they have found is important to implement in the pediatric EHR. The authors also point out that the increased survival of complex pediatric patients make care coordination functionality an increasing priority – however, they are otherwise silent on this topic throughout the report. This would seem like a functionality that would be critical for both pediatric and adult medicine and is clearly implicated as a key aspect of the PCMH – part of Meaningful Use. The authors briefly discuss the importance of EHR interoperability across providers and sites of care to enhance care coordination. However, it is surprising that individualized plans of care for children with special health care needs, particularly those with complex chronic disease, are never mentioned/addressed.	Thank you for your comments. We do refer to meaningful use and the PCMH in the GQ4 section, with MU driving PCMH development. We have also updated our reference to the IPC/emergency information form in the discussion on inpatient and outpatient transitions.

Commenter	Section	Comment	Response
Public Reviewer (AAP)	Findings	AAP is grateful for the brief's focus on privacy and confidentiality issues, particularly with respect to the care of adolescents. As the draft notes, while current laws mandate and most providers recognize the need to ensure adequate privacy for adolescents and young adults, few EHR systems effectively support this functionality. It is imperative that adolescents believe that their care and the issues they discuss with their pediatrician can and will be kept confidential. Otherwise, adolescents will likely forego seeking needed health care, especially for reproductive health, substance abuse, or mental health concerns. AAP also appreciates the report highlighting the importance of privacy issues when it comes to recording certain family medical history like Huntington's disease, HIV, or psychiatric illness	No response needed.
Public Reviewer (AAP)	Findings	As an organization that represents 62,000 pediatricians, we thank the authors of the draft report for recognizing that one of the most salient and valuable features of a truly functional pediatric EHR is the capacity to adapt seamlessly to or even improve workflow of the health care setting. As the report notes, pediatrics is a high volume, low margin venture, and most EHRs add an inordinate amount of time and complexity to the workflow which have proven to be problematic for those trying to add the technology to their practice. In other words, the "usability" of the pediatric EHRs needs to be improved significantly	No response needed

Commenter	Section	Comment	Response
Public Reviewer (AAP)	Findings	As most school aged-children spend the majority of their day attending school, and as many schools have health clinics where services are rendered to children, it is essential that pediatricians are able to access pertinent health care data from schools. Although it is not a major focus of the current draft technical brief, the AAP encourages the authors to expand on the ability of health care providers to communicate with schools in a HIPAA complaint fashion, as being able to store information about which school a child attends, what medical forms may be required by the school and what health services they receive at school should also be a function of the pediatric EHR	We have added a comment about this.
Public Reviewer (AAP)	Findings	As the draft report brief highlights, one current obstacle to full functionality is the limited ability of most EHR systems currently in use to interface and communicate with State immunization registries. It is important for pediatricians to know if a child is up-to-date or delayed on her immunizations, and the ability to gather immunization history from an immunization registry can help the pediatrician to determine if a child is late or overdue for certain immunizations as well as preventing unnecessary duplication of immunizations. Despite the variety of vaccination requirements between the States, an EHR should have the ability to communicate with multiple State immunization registries.	We agree that this is an important issue and debated about whether to include interstate specific language in this brief. However, the scope of this brief is toward EHR functionality for the pediatric PCP, and this topic seems more geared toward the health information exchange domain. As such, we have limited our wording to "incorporating data from immunization registries, including interstate registries, when available."

Commenter	Section	Comment	Response
Public Reviewer (AAP)	Findings	As we move toward a more functional pediatric EHR system, it is important to allow EHRs to be flexible in response to changing federal, State, and local reporting requirements, as well as changing recommendations on care and treatment protocols. As more clinical quality measurements are recommended specifically for the pediatric population, the EHR must be flexible enough to support these recommendations, including the ability to capture data and to generate relevant reports	We agree completely.
Public Reviewer (AAP)	Findings	The AAP appreciates that the report specifically singles out the challenge inherent in patient identification in an EHR system. The identity of a patient can be hard to track because of a plethora of changes in life and living situations: divorce, moving across town or across state lines, changing insurance providers, placement in foster care, emancipation as a minor, and so on. As the AAP has suggested in the past, a functional EHR system would adopt a universal patient identifier that would be assigned immediately at the time of birth and be linked to the child as she ages and grows into adulthood, as well as while she changes providers who provide her care. So far, this type of universal patient identifier has not been achieved –in part due to the restrictions placed on the Administration by Congress - but it is a necessary step in creating a truly functional EHR environment.	Thank you for your comment. This would certainly be a useful tool to help with the identity concern. We do mention the universal identifier as a "desirable but as yet unachieved goal" in our section entitled, "The particular challenge of identity" under GQ2.

Commenter	Section	Comment	Response
Public Reviewer (AAP)	Findings	The AAP appreciates the fact that the report contains language addressing the need for pediatric EHRs to help pediatricians manage clinical sub-populations, such as children with special health care needs such as cerebral palsy, spina bifida, autism, and developmental disabilities, as well as children who may be homeless, in foster care, or living with food insecurity. Fully functional EHRs should be able to have a usable patient reminder/recall system that prompts providers to discuss issues of particular importance to the sub-population as well as document information that may not be captured when treating the general pediatric population. In addition, as multiple providers may be involved in handling care for such patients, it is imperative that there be a consistent approach and standard definitions between EHR systems so that different systems may exchange pertinent subgroup data important to providing care for such children.	Thank you for the comment. We have expanded our discussion about managing a clinical subpopulation and now include references to decision support as is specific to children who have a specific diagnosis or condition. This is found in both GQ1 where we emphasize the importance of such decision support as well as in GQ2 where we mention the challenges, specifically that recommendations be decidable and executable. We also agree about the importance of being able to share clinical data amongst various providers and systems, and we mention this as well. Some of this falls into the domain of the health information exchange, and AHRQ is currently working on an additional report to help guide the development of this domain.
Public Reviewer (AAP)	Findings	The AAP pioneered the concept of the patient-centered medical home, as it is the preferred setting for delivering consistent, timely, and quality medical care for a child. For EHRs to achieve full functionality, the EHR must allow data to be efficiently captured and shared between pediatricians and other providers within the medical home, as well as providers outside the medical home. As the report notes, this is particularly important for the provision of care in emergency care settings.	No response needed

Commenter	Section	Comment	Response
Public Reviewer (AAP)	Findings	The fact that many EHRs currently in use generally decrease a provider's productivity is a challenge that must be addressed and solved. As the report highlights, one study has found that patient visits at pediatricians using fully functional EHR systems were 18 percent longer than those using a basic EHR system (there was no comparison made with those still only using paper records). In addition, while 34 percent more counseling topics were covered in the fully functional EHR encounter—a finding that the AAP applauds—these longer visits could likely mean fewer patients seen in a normal day, proportionately lower payment levels, and possible provider dissatisfaction with the EHR. It is our hope that some of the issues discussed in this report can be analyzed and used to help create a more functional EHR that can improve workflow and provider satisfaction with utilizing health information technology in their practice. This would include integration of automatically providing patient handouts in EHR systems to improve workflow and documentation of materials provided, as well as incorporating standard screening forms into EHR in a meaningful way.	No response needed
Public Reviewer (APTA)	Findings	The use of Clinical Decision Support is identified as a component of the EHR. The identification of tracking and identifying concerns when functional milestones are not reached and improving early referral to specialty health care services such as Physical Therapy is essential. This functionality to the EHR core should be considered	We have edited the report to clarify that the information applies broadly and that the care of children's health is provided by a wide range of providers.
Public Reviewer (APTA)	Findings	Under Documentation and Billing Ideally EHR, would link with evidenced based clinical practice guidelines when available for subpopulations which should include all service providers, not just pediatricians, to improve reliability of receiving evidence based care	We have added a comment about this.

Commenter	Section	Comment	Response
Public Reviewer (APTA)	Findings	Under Pediatric-Specific Norms and Growth Charts for subpopulations including charts /curves that would increase clinician use of such tools would improve prognostication and decrease unwarranted care in some cases. An example of this might be the Gross Motor Function Classification System curves	Thank you for your comment. This does sound like a useful functionality, although it did not surface prominently during our literature review or our discussions with key informants. It is out of scope of this brief to recommend specific screening instruments unless they appear prominently in the literature related to the EHR, such as for growth charts. The GMFCS could be considered as an example of a custom form that could be included in the EHR, and we encourage EHR venders to include the ability to add custom forms and data collection tools.
Public Reviewer (APTA)	Findings	Under the section Managing Pediatric Conditions, the inclusion of referral to non-physician services such as physical therapists for those populations with chronic illness should be considered. The coordination of care between users of the EHR (not only the pediatrician) would be beneficial to optimize care for these populations.	We have revised the report to refer to the range of providers who care for the health of children and adolescents.
Public Reviewer (Andy Spooner)	Findings	I do think that the discussion of adolescent privacy requires more nuance. The reader might come away with the impression that the solution to the privacy challenges posed by adolescent care can be taken care of via configuration of privacy settings in the EHR. My experience suggests that the solution to these challenges is much more about practice policy than EHR features. While it may be true that all 50 states allow certain care without parental consent or notification, these laws are designed to allow adolescents unimpeded access to care at the time of an individual encounter when they show up with, say an STD or suicidal thoughts where a barrier to care would be of significant risk to the child's immediate health state. These laws are not blanket licenses for adolescents to get broad categories of care over a long term without any parental involvement.	Thank you for your comments. We agree with you that much of the difficulty in this area has to do with the extremely varied situations that may arise in care of the adolescent patient. The ultimate solution to many of these situations will necessarily remain in the domain of clinicians, the AAP, and specifically the AAP Section on Adolescent Health. For EHR designers and from a functionality standpoint, probably the best we can do is support clinicians and practices in implementing and enforcing local privacy policies. We have modified this section to address this difficulty more clearly.

Commenter	Section	Comment	Response
		The parent is still the legal guardian and the financial guarantor in most cases. If the parent wants information about their child they are going to get it. There's not any legally defensible technical way to wall off the information from the parent. There is also a distinction that needs to be made between the adolescent's ability to consent for care which may be protected by state law and the adolescent's right to have the information about the care hidden from parent or legal guardian, which is not in most states. State laws that allow an adolescent to get care without a parent do not necessarily protect the adolescent from disclosure of information to the parent. A better general approach in the primary care or chronic care setting is simply to present a policy to the adolescent and the parent that they can assent to and consent to respectively. Basically the best you can do is to get the parent on board with confidential care. If the parent is fundamentally opposed to the idea it probably does more harm than good to hide parts of the chart by means of a technical setting. Similar agreements can be reached in acute care although the lack of a long--term relationship between care provider and parent or legal guardian makes this difficult. I think the document should acknowledge that there are some who regard the hiding of information prescriptions, diagnoses, records of encounters from the legal guardian of the child presents a potential risk to the child's health and to the standing of the adult as the responsible guardian. Many practitioners will weigh this risk against the benefit and decide to proceed with the idea of presenting a partial chart to certain users. I just think we need to make it clear in this document that this is an important risk/benefit analysis.	

Commenter	Section	Comment	Response
Public Reviewer (Andy Spooner)	Findings	Regarding growth charts for special populations, page 24. The barrier to the implementation of population--specific growth charts is not technical and it's not due to a lack of commitment from EHR vendors. In the most widely--implemented EHR products adding growth charts is as technically easy as importing a spreadsheet of values representing the normative curves. The barrier to this simple action is in: 1) getting permission to use this data from the publisher, and 2) getting the original data to avoid having to redigitize the curves from published images. Even as late as 2014, authors are offering population--specific growth curves only as images not data and with no license to use the underlying data. Since there's no economic value of these data to the publisher, the reason for not proactively offering license for its use may simply be the lack of awareness of the interest in using data in this way. A solution to this problem might be to use the influence of a professional society to encourage the release of this data under a suitable public license.	Thank you for your comments. We have decided to rewrite the implementation challenges for the "Growth Charts and Norms" section. While we do not address proprietary growth charts in this section, we do emphasize the lack of availability of alternative growth charts for special populations. In our "Routine Health Care Maintenance" section, we have added references to the difficulty of including licensed products in EHR's, which may apply to any proprietary growth charts.
Public Reviewer (Debbie Badawi)	Findings	As someone in the public health arena, I believe that being able to identify patients not only by condition, but also by screening results is critical for medical home implementation. The ability to track patients by positive newborn screen results (metabolic or point of care) and by developmental screens, adolescent depression and substance use screens, etc. is crucial.	No response needed.

Commenter	Section	Comment	Response
Public Reviewer (Matt Elrod)	Findings	The use of Clinical Decision Support is identified as a component of the EHR. The identification of tracking and identifying concerns when functional milestones are not reached and improving early referral to specialty health care services, such as Physical Therapy is essential. This functionality to the EHR core should be considered. Under the section Managing Pediatric Conditions, the inclusion of referral to nonphysician services such as physical therapists for those populations with chronic illness should be considered. The coordination of care between users of the EHR, not only the pediatrician, would be beneficial to optimize care for these populations. Under Documentation and Billing, ideally EHR would link with evidenced based clinical practice guidelines when available for subpopulations, which should include all service providers, not just pediatricians, to improve reliability of receiving evidence based care. Under Pediatric--Specific Norms and Growth Charts, for subpopulations including charts curves that would increase clinician use of such tools, would improve prognostication and decrease unwarranted care in some cases. An example of this might be the Gross Motor Function Classification System curves.	We have edited the report to clarify that the information applies broadly and that the care of children's health is provided by a wide range of providers.

Commenter	Section	Comment	Response
Peer Reviewer #9	Findings	GQ1 findings cover the core functionalities that were identified and relate them to data on how they should improve health in children. The brief correctly identifies delay in care as a significant mechanism of action of lack of care coordination that is central to pediatric practice as illustrated within each of the selected functionalities. Vaccines are central to pediatric practice and 2D barcodes will help capture accurate data and avoid data reconciliation problems that plague current practice. Many of today's EHR are built following a paper model of fixed schedules of multiple doses in fixed tabular format. The brief correctly identifies the need for flexible formats and it is important to emphasize the need for documenting vaccine products chronologically as administered and then mapping to valid doses of included components. A single view of vaccine will not work to support the complexity of vaccine CDS and it is unfortunate that even some immunization information systems (IIS or registries) still follow traditional formats that sometimes requires duplicate entries of a single administered dose in multiple locations or combining vaccines on different lines of a table to get a complete picture of what a child has received. Development tracking is central to pediatric practice and the challenges of defining what it means to implement Bright Future is clearly identified. An important part of bright futures is address several different key components (such as including oral health) and the authors are correct to identify the problems with items that are not actionable and the need to address only portions of the complete bright futures at a single visit due to time constraints and limits on the amount of information that parents can learn at one visit.	Thank you for your thoughtful review of this document. We appreciate your comments. From your comments, we note two specific items to address: 1) to ensure the report addresses the importance of dynamic problem and medication histories and 2) addressing newborn data. Regarding #1, we have added a reference to this in the documentation section when we discuss a general patient summary screen. Regarding #2, we believe we address this mostly in GQ2 under age-based transitions, where we discuss the newborn transition and include discussion of newborn screening data.

Commenter	Section	Comment	Response
		Including Bright Futures is essential now that it has been incorporated into essential preventive services and more work is need to define how it should be implemented to stress its key characteristics. Family dynamics and family oriented data entry are indeed essential and family history has both a genetic and a social component. Appropriate privacy protection for adolescents is essential and the report points to much progress in defining what is required to make this operational. There is also an inverse concept of disclosure of information to an adolescent about their history and medical status that is an important part of age based transitions discussed later in the report. Having privacy settings follow the data is essential given the longitudinal movement of data and changes in providers over time and multiple providers in the different settings serving the same child. Managing clinical sub-populations is essential to optimal care of pediatric chronic diseases that represent a very different mix from adults. This is an area where good care coordination and perhaps even more data collection from patients is very important. Many pediatric medications are used on a prn or as needed basis and it is important to document this on an ongoing basis as pediatric recall and using parents as informants have significant limitations. Medication management and electronic prescribing have many pediatric requirements that are addressed in the report. Although the literature may not document it clearly, I believe that compared to adults, a larger proportion of pediatric medications are initially prescribed by a provider or in a setting other than primary care such as emergency department, inpatient, or specialist.	

Commenter	Section	Comment	Response
		This makes the ability to import prescription from electronic history or patient summary documents very critical to allow primary to continue management and to avoid manual re-entry from parent obtained history or human readable documents that should be fully interoperable. The need for a structured SIG (administration instructions) is important to allow weight based dosing calculation from prescription history and not just as part of the prescription writing process. Billing challenges and terminology issues are appropriately identified. Adult EHR focus very heavily on active problem and medication lists and the expectation that many problems and medications once started will continue indefinitely. In pediatrics, more problems and medications are self limited and it is an important pediatric requirement to be able to better visualize problem and medication histories over time and to summarize patterns from many visits over time including use of emergency departments, consultant specialists, and inpatient admissions. Most ambulatory EHR focus on current billing needs and not visualizing the complete patient history. Growth charts and pediatric norms are discussed well and it is important to note that norms change over time and that it may be appropriate for EHR to enable importing of new datasets to reflect population changes and special populations. Generic solutions may be helpful rather than assuming that even this basic problem is fully defined today. What was not identified and included under GQ1 is the issue of basic newborn data and newborn screening that are clearly unique and special components of pediatrics and that have implications extending beyond the initial newborn visits after hospital discharge.	

Commenter	Section	Comment	Response
		This is an area of mandatory interoperability that requires migration of data from the mother's OB record (both prenatal and delivery) to the infant's inpatient record to the infant's outpatient record along with sharing with public health and with specialists. Newborn screening is universal in the United States and changing to include both blood spot and point of service testing such as hearing screening and critical congenital heart disease (CCHD) pulse ox screening. It is important pediatric requirements to both move data and also to assure that the screening process is completed and that data are reported and final diagnoses recorded and shared. This is an important opportunity in pediatrics that has not been exploited and implemented but should be a focus of future work. Diseases such as sickle cell disease and cystic fibrosis clearly demonstrate the value of moving data and assuring that appropriate therapy is started and continued. The paradigm of newborns screening that was established 50 years ago for PKU and congenital hypothyroidism has now become more complex and sophisticated and its requirements should be addressed in EHR. Failure to identify this need by key informants should perhaps be noted in the brief as an area that has been identified in the literature but that has not reached the attention of key informants perhaps because even the best systems today are not yet successfully addressing the care coordination and data sharing requirements of this complex task that must involve public health.	
Peer Reviewer #9	Findings	The evidence map in response to GQ3 is helpful for each of the key issues of vaccines, CPOE, and obesity illustrated.	Thank you

Commenter	Section	Comment	Response
Peer Reviewer #9	Findings	The findings are presented well organized by the guiding questions and the limited scope of key functions that were selected. Newborn issues and pediatric chronic disease issues are effectively relegated to a small section of Managing a Clinical Subpopulation (page 17) and the literature that provides evidence in this area is limited. Some of the newborn issues are also addressed under challenges of identity (page 28).	No response needed
Peer Reviewer #9	Findings	The findings on GQ2 are particularly important for documenting the differences between pediatric and adult EHR. Transitions of care are extremely important and poorly done transitions lead to loss of data that a child, and sometimes even the parents, cannot replace through history. The mix of chronic disease is very different in pediatrics and coordination with multiple specialists for children with special health care needs is very important. The newborn transitions and newborn screening are a critical example of mandatory interoperability between the mother's record, the infant's record, inpatient and outpatient, primary care and specialists, and between public health and both inpatient and primary care to complete the screening process and document whether problems with hearing screening are loss to follow-up or loss to documentation. Identity changes are universal for the newborn and newborn screening is one of the few universal programs that are done for over 4 million newborns each year. The challenges of vaccines and privacy are noted and discussed further in referenced publications. Workflow issues are very important and part of the challenge of developmental screening and anticipatory guidance are the need to distribute topics over multiple visits but typical EHR focuses only on single visits and not the context of multiple visits for well child care.	No response needed

Commenter	Section	Comment	Response
Peer Reviewer #9	Findings	The findings on GQ4 highlight many key issues of utility, testability, and usability, but the specificity and computability is critical and much progress has been made recently on immunization forecasting and testing that functionality as noted at the end of this section of the report. Recent advances in standards for specifying and reporting clinical quality measures are a general issue for all EHR that will benefit pediatrics. One strategy for dissemination that is not highlighted in the report is recent progress on standard application program interfaces (API) such as SMART that have been demonstrated by investigators at Boston Children's Hospital working with several vendors. The API approach is an important contrast to prior work in clinical decision support based on web services in that web services allow the developer of the service application to define the interface that the EHR vendor must comply with. When using standard API, the EHR vendor presents data in the EHR is a standard interface and the developer of CDS applications or other extensions to EHR must conform to a standard that all vendors must comply with. This new API strategy has demonstrated several successful applications and may be a new direction for dissemination of pediatric core functionality as it may be easier to vendors to add an API to existing EHR while others build some of the challenging but shareable pediatric functions such as growth charts or immunization forecasting.	We agree that a SMART platform/API would be highly beneficial for all users, although this is not necessarily a pediatric-specific advance, and it did not appear in our literature review, despite the clear demonstration of a growth chart built with the SMART on FHIR platform.
Key Informant #1	Summary and Implications	The comments about vendors not creating the standards was an excellent one and should be highlighted even more. When providers do not step up to set standards, the vendors are left adrift.	Thank you for your comment.

Commenter	Section	Comment	Response
Key Informant #1	Summary and Implications	Using the terms from the Rogers Diffusion of Innovation Theory and suggest citing?	Thank you for this suggestion. Rogers' Diffusion of Information Theory refers to the spectrum from innovators to laggards. We considered where this might be inserted into the document, but in the end we decided not to include this spectrum, as we wanted to focus mostly on the functions that will improve care provided by all clinicians.
Key Informant #2	Summary and Implications	One reference is old enough that it warrants softening or updating. "Currently, no existing EHRs are completely "Bright Futures compatible", however several products that focus on the pediatric population have implemented portions An idealized E HRthat incorporates the Bright Futures Guidelines 62" 62. Hagan JH, Jr. Discerning bright futures of electronic health records. Pediatr Ann. 2008 Mar;37(3):173-9. PMID:18411861. Since that time, at least 3 EHRs have incorporated BF into their systems, including the one that Joe Hagan uses. 2008 is an eon ago in EHR timelines.	Thank you for your comment. We have clarified this and have significantly reworded this section.
Peer Reviewer #1	Summary and Implications	"...child become and adolescent". Needs to be corrected.	We revised from, "As the child become and adolescent,..." to "As the child becomes an adolescent,...".
Peer Reviewer #1	Summary and Implications	This was not discussed at length in the body of the paper. It needs to be supported in the text.	Thank you for your comment. The literature was relatively silent on family dynamics, although this was identified as important by our key informants. We discuss this in the "family dynamics" section.
Peer Reviewer #2	Summary and Implications	change "child become and adolescent" to "child becomes an adolescent"	We revised from, "As the child become and adolescent,..." to "As the child becomes an adolescent,...".
Peer Reviewer #2	Summary and Implications	Overall, this is a good summary.	No response needed
Peer Reviewer #3	Summary and Implications	This section should be expanded with a clear outline of "take home" points.	We have elected to leave this section as is, but thank you for your suggestion.

Commenter	Section	Comment	Response
Peer Reviewer #4	Summary and Implications	This report will be the most useful to pediatricians to help them organize their search for an adequate EMR. It will help pediatricians who sit on committees to direct the choice of an EMR for an Integrated Delivery System. There should be special attention to EPIC which is being widely adopted (projected that 50% of the physicians will be on EPIC by 2020).	Thank you.
Peer Reviewer #4	Summary and Implications	Vendors can do a gap analysis between the functionality they currently have and the functionality the report recommends. There should be a separate certification for pediatric EMRs to assure that a particular vendor is delivering the functionality that is needed for children. (The CCHIT testing and certifying of EMRs is a good example of assuring this.)	Thank you.
Peer Reviewer #5	Summary and Implications	As above - for the findings-- It is not clear if this process focused the requirements to a minimal critical set. If so, it might be important to have a separate section within the findings clarifying what those are.	This process did not identify a specific minimal set.
Peer Reviewer #6	Summary and Implications	Seems like a reasonable summary of the report. Might go farther and make a recommendation (e.g. CPOE appears to show clinical and outcome benefits to patients and practices should be incentivized to adopt this as an early feature)	It is not within our scope to make recommendations; rather we have provided an overview of the state of the science as part of a larger effort to develop recommendations.

Commenter	Section	Comment	Response
Peer Reviewer #7	Summary and Implications	The summary nicely bring the brief to closure and highlights the high level domains in need of focus, however, there is no discussion of the parallel needs to improve evidence and clarity of recommendations nor to involve vendors/policymakers/clinicians/and parents in this to achieve consensus with a goal of supporting the needs for all the groups to deliver better functionality and efficiencies. I think the authors also need to acknowledge any limitations from their methods. For example, only one vendor was interviewed, much of the knowledge and experience of EHR use is not published, and no patients/parents were interviewed. Another limitation is that there is growing evidence that clinicians across the care spectrum are dissatisfied with EHR design and use and it may be hard to differentiate between those specific to the PEHR and more general frustrations. These are not major limitations but worth acknowledging.	We have added a paragraph about limitations.
Peer Reviewer #8	Summary and Implications	The summary and implications largely remain silent on the challenges presented earlier in the report and thus do not address potential solutions to these challenges such as user-centered design of core functionalities. This section falls short of discussing a conceptual framework that would help to organize future research and policy.	We have added a summary of the challenges to the final summary section.
Public Reviewer (APTA)	Summary and Implications	We have no specific comments to this section	Thank you.

Commenter	Section	Comment	Response
Peer Reviewer #9	Summary and Implications	The summary covers the key findings well and stresses the implications for patient care of immunization forecasting, growth and development, medications, pediatric conditions and special populations, growth charts and other norms, and family dynamics. The conclusion that adding these pediatric functionalities will benefit all EHR is very appropriate. The complex issues of adolescent privacy are not discussed again as the technical report pointed to many resources but not to clear directions that are ready for implementation. The issue of changing scale and units is integrated into the discussion of norms. Perhaps an important omission is not discussing the special issues surrounding the newborn and newborn screening that are unique to pediatrics and not limited to the inpatient setting because the context of newborn data is significant for several years. Newborn issues form a context for evaluation of problems later in life and need to be readily accessible and just part of the newborn visit note on transfer to outpatient care. Newborn screening, including hearing screening, is an important part of the interaction with public health just as is interaction with immunization registries. In fact, growth norm and other data are also part of public health informatics relevant to pediatric EHR. There has great awareness of limitation of public health readiness for immunization information systems	Thank you for your comments. We concur that newborn screening is extremely important. We address newborn screening in the “Age-based transitions” section and have now expanded on this section to emphasize the importance of persistent storage and availability of newborn screening results.
Key Informant #1	Next Steps	Should emphasize the need for a broader use of stakeholders are needed to assure the EHR serves the child and improves the child's health no matter where the health care is delivered.	Thank you for the comment. We have added a concluding sentence to the "Next Steps" section to emphasize the role that every stakeholder plays.
Peer Reviewer #1	Next Steps	I have no comments on this section.	Thank you
Peer Reviewer #2	Next Steps	Overall this document is clear.	No response needed

Commenter	Section	Comment	Response
Peer Reviewer #2	Next Steps	please describe how the enumerated list of features will be made available. As currently written it implies this list is available in the report, but I do not see it anywhere. I apologize if I missed the list.	We have rewritten that section as it was unclear - there is no such enumerated list in the document.
Peer Reviewer #2	Next Steps	The usability of this document would be improved by including the enumerated list of features mentioned by the authors in the "Next Steps" section.	Thank you for your comment. We have added an additional table and included it in the "summary and implications" section, where we felt it was more appropriate.
Peer Reviewer #3	Next Steps	Would suggest expansion of this section as well.	Thank you for your comment. We have rewritten this section to focus more on scope of this brief. We discuss recommendations in the "Summary and Implications" section, but it is out of the scope of the brief to provide specific recommendations for action.
Peer Reviewer #4	Next Steps	I recommend that functionality around communicating with other EMRs and health departments and schools as well as registries(addressed) and data analysis in the physician's office would be the next step.	Thank you for your comment. We have taken this into consideration.
Peer Reviewer #4	Next Steps	This report should be the first of a series as new data becomes available. Pediatricians will have to lobby their vendors heavily to adopt new content and functionality.	No response needed
Peer Reviewer #5	Next Steps	It might be nice to flesh out the next steps more into a series of actionable activities (if possible)	It is not within the scope of this project to develop a future plans or next steps proposal; nonetheless, we have expanded that section to explain the way this work may be used.
Peer Reviewer #6	Next Steps	I thought a stronger call to specific areas for future research funding might be appropriate.	Thank you for your comment. We have rewritten this section to focus more on scope of this brief, leaving specific recommendations to the "summary and implications" section. It is out of the scope of the brief to provide specific recommendations for action.

Commenter	Section	Comment	Response
Peer Reviewer #6	Next Steps	It was a little scant. I think with some studies like the one about developmental screening and referral to early intervention, and more references in that domain, a stronger claim (e.g. meaningful use should incentivize these specific features as they improve the connection with existing services resulting in improved population health) may be able to be made.	No response needed.
Peer Reviewer #7	Next Steps	This seems awfully short based on all the ideas and barriers and needs identified in this brief. See additional recommendation in Clarity/Usability Section	Thank you for your comment. We have rewritten this section to focus more on scope of this brief, leaving specific recommendations to the "Summary and Implications" section. It is out of the scope of the brief to provide specific recommendations for action.
Peer Reviewer #8	Next Steps	The next steps are presented in one vague general sentence about doing more studies to demonstrate the value that may result from improving pediatric EHR functionalities. The recommendations are not specific at all and could really benefit from a more thoughtful and detailed presentation.	Thank you for your comment. We have rewritten this section to focus more on scope of this brief, leaving specific recommendations to the "summary and implications" section. It is out of the scope of the brief to provide specific recommendations for action.
Public Reviewer (APTA)	Next Steps	We have no specific comments to this section	thank you
Public Reviewer (EHRA)	Next Steps	We are encouraged by the work thus far in this important area, and suggest that next steps should focus on a more specific prioritization of issues	We have rewritten the next steps section.

Commenter	Section	Comment	Response
Peer Reviewer #9	Next Steps	Finally, it is important to recognize that EHR is passing a tipping point, even in pediatrics, where attention must be given to the requirements for maintaining and growing EHR over a lifetime of practice and patient care. Implementation of pediatric requirements for EHR is not a one time event, but an on-going process of updating and maintaining systems as norms and guidelines changes and systems evolve, Satisfying the need for pediatric requirements may need to include methods for updating decision support through new data and using the existing interoperability and interfaces with updated external decision support modules that can be shared by multiple vendors. Providing maximal assistance and guidance to vendors to properly implement pediatric requirements will be a critical next step to enabling further research on the value and impact of including these requirements in EHR. Some of this will require further refinement and specification of a single preferred strategy for implementing a requirement with linkage to available data such as the CDC Clinical Decision Support for Immunizations (CDSi) or a more clear illustration of growth chart implementation using CDC LMZ tables of norms to compute and display percentiles.	Thank you for your comment. We hope this report will be leveraged to identify gaps and areas of improvement.
Peer Reviewer #9	Next Steps	It is also worth noting that vendors can build standard API interfaces that will exposure their EHR data and enable external modules to work with EHR products from multiple vendors that will clearly facilitate replicating research on improvements in care using multiple vendors EHR in multiple populations.	Thank you for your comment.

Commenter	Section	Comment	Response
Peer Reviewer #9	Next Steps	The next steps focus exclusively on further research to measure the improvements in care that can be achieved through incorporating pediatric functional requirements into EHR. It is reasonable to expect that if those improvements can be documented they will lead to improvements in quality of care and satisfaction of pediatric users of EHR. It may be reasonable to expand this section with a few comments on intermediate steps that could assist vendors in implementing functions through improving the computability and clear definition of strategies for implementing requirements that will facilitate the proposed research such as using the CDC Clinical Decision Support for Immunizations (CDSi) [with documents available on the CDC website] to provide a solid basis for immunization forecasting including extensive test data to validate systems, the CDC distribution of growth chart norm data in LMZ format, and other tools for implementing requirements.	Thank you for your comment. We have rewritten this section to focus more on scope of this brief, leaving specific recommendations to the "summary and implications" section. It is out of the scope of the brief to provide specific recommendations for action.
Key Informant #1	Clarity and Usability	Conclusions must emphasize more what the gaps are and the need to close the gaps to meet the goals the report hopes to achieve.	Thank you for your comment. We have added statements to the conclusion section to address the gaps and reference the summary of ongoing studies that we identified as relevant to the technical brief topic.
Peer Reviewer #1	Clarity and Usability	The section headings need to be revised for better read. The use of fonts and bold lettering is a bit confusing and does not delineate the sections well. Perhaps include numbering or lettering (A.1, or 1.1) could help.	The format of the report adheres to the AHRQ requirements for technical briefs; however, we have itemized the functionalities for GQ1 and added the following statement: " The following section will address specific information for: 1) vaccines; 2) routine health care maintenance; 3) family dynamics; 4) privacy; 5) managing pediatric conditions in vulnerable populations; 6) mediations; 7) documentation and billing; and 8) pediatric-specific norms and growth charts. " to GQ1.
Peer Reviewer #3	Clarity and Usability	Both the summary and implications section as well as next steps section could be improved thereby enhancing the usability of the report.	Thank you for your comment. We have taken this into consideration.

Commenter	Section	Comment	Response
Peer Reviewer #4	Clarity and Usability	The listing of ongoing studies show robust activity in studying EMR data and helping to improve care. This should be encouraged and expanded.	Thank you for your comment. We have taken this into consideration. We would like to see even more studies, but it is out of the scope of this brief to provide recommendations, only to illuminate what exists.
Peer Reviewer #4	Clarity and Usability	Well structured report which can be improved by an executive summary. Some of the points are lost in lots of discussion. Hence the executive summary to highlight the salient functions.	Thank you for your comment. This is an excellent suggestion. The format of the EPC Technical Brief is set by AHRQ, but there will be opportunities for dissemination of the material that could follow this recommendation.
Peer Reviewer #6	Clarity and Usability	It was OK - I thought it could be tightened up and organized more by themes than by clinical questions, but I understand organizing the findings by clinical question is the methodology used in AHRQ Evidence Reviews.	Thank you for your comments. We have significantly rewritten several areas to provide more clarity and organization.
Peer Reviewer #7	Clarity and Usability	I think this document would benefit for a simple table that summarized the key areas and recommended next steps (actions) in each area based on the impressive content and work in this brief.	Thank you for your comment. We have added such a table to the "summary and implications" section.
Peer Reviewer #8	Clarity and Usability	Figure 1. – Consider providing the reasons for excluding records at the abstract stage since 2770 records were excluded in this step.	We have followed the AHRQ EPC methods in which we do not provide reasons for abstract exclusion. These numbers are actually not terribly high.
Peer Reviewer #8	Clarity and Usability	Please see comments above related to GQ #3 and #4 as well as the Summary and Implications section.	Thank you.
Public Reviewer (EHRA)	Clarity and Usability	Finally, we believe that this report is only the beginning of the dialogue on pediatric EHRs. In our experience, clear communication about the existing capabilities of EHRs, and the effort involved in implementing new features and enhancements (especially given the environmental barriers mentioned above) are essential to successful design and development. We welcome a continued conversation with all the stakeholders involved in the report	We agree entirely.

Commenter	Section	Comment	Response
Peer Reviewer #9	Clarity and Usability	Overall the report has good clarity and good usability, but might benefit from more clarification of the role and meaning of pediatric special populations earlier in the report with illustrations of topics covered and included in this section that otherwise might appear to have been omitted such as newborn related issues or pediatric chronic disease. An important objective of the report is to narrow the focus of the very broad range of requirements in the Child EHR Format and this goal may give the false impression that important differences between adult and pediatric EHR requirement and use have been omitted. Many of these issues fall under the special populations section and the term may need some clarification since different readers will have different expectations. Usability should be considered from several user perspectives including vendors and developers of EHR, practicing pediatricians, clinical informatics researchers, and parents/consumers of pediatric healthcare.	Thank you for your comments. We have modified the suggested sections to provide more clarity and meaning. We also hope this brief will start conversations from several user perspectives, as you mention.