Community Health Records: Establishing a Systematic Approach to Improving Social and Physical Determinants of Health

To systematically improve population health in the United States, community health records (CHRs) must be defined, developed, and implemented. Like electronic and personal health records, CHRs have both unique and overlapping information.

CHRs contain data about communities, including the social, physical, and lifestyle determinants of health. These records will serve to complement electronic and personal health records to provide a more complete view of population health, allowing stakeholders to target community health and quality-of-life interventions in a data-driven and evidence-based manner, establishing the basis from which organizations can develop a systematic approach to improving community health.

This commentary calls on the United States to conduct a set of consensus activities to define and implement CHRs. (*Am J Public Health*. 2017;107:407–412. doi:10.2105/AJPH.2016.303602)

Deryk Van Brunt, DrPH

The 2014 President's Council of Advisors on Science and Technology's Report to the President and Congress, on accelerating health improvement through systems engineering, featured strategies and recommendations to enhance the health of all Americans.[1]

As a follow-up to that report, this perspective commentary expands the recommendations for improvements in population health, outlining how community health is an important component of population health, and how the use of community health records (CHRs), a curated set of measures that include the social, physical, and lifestyle determinants of health, represents an opportunity to be more systematic in improving community health.

RATIONALE

A report from the Centers for Disease Control and Prevention (CDC) shows that more than 50% of the determinants of health are related to lifestyle, and the social and physical environments in which people live (http://www.cdc.gov/socialdeterminants). Factors such as income, education, physical activity levels, housing, and eating habits collectively affect health in a more significant way than factors related to the access to, and quality of, health care services.[2–7]

To improve the health of populations, organizations and communities must find ways to improve these broad and powerful determinants that influence health (http://www.who.int/social_determinants/thecommission/en). More specifically, foundational research must become data-driven and evidenced-based to direct population health improvement activities efficiently.[8]

To be effective, health and social services sectors must be able to systematically measure and track a full range of factors that influence the health of our communities. A baseline set of data about communities, and related presentation and decision-making tools, would help populations gain insights into important health issues and find effective community programs and policies that can address the specific social, environmental, and lifestyle factors that ultimately affect their health status. This baseline set of data is the community health record.

To improve the health of a population most effectively, three types of health records will need to be accessed: electronic medical records (EMRs) and electronic health records (EHRs), used primarily by clinical teams to support decision-making in health care delivery; personal health records (PHRs), to support individuals and families pursuing good health and high quality of life; and CHRs, to support stakeholders working to improve community health.[9]

The Venn diagram in Figure A (available as a supplement to the online version of this article at http://www.ajph.org) depicts how each type of health record has information that is distinct from, and overlaps with, information from the other records.

Community health can be thought of as a component of population health. Population health gained wide acceptance with the publication in 2008 of the Triple Aim Framework of Berwick et al.,[10] which was incorporated into the Affordable Care Act and was further advanced by David Nash, MD, MBA, at the Thomas Jefferson University College of Population Health.[11] This framework calls for systematically addressing the social and physical determinants

ABOUT THE AUTHOR

Deryk Van Brunt is President of the Healthy Communities Institute, a Conduent Company, and with the School of Public Health, University of California, Berkeley.

Correspondence should be sent to Deryk Van Brunt, UC Berkeley School of Public Health, Division of Biostatistics, 101 Havialnd Hall, Berkeley CA 94720 (e-mail: derykvanbrunt@Comcast.net). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

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of health and health equity in our communities, in addition to making improvements in clinical transformation.

THE COMMUNITY HEALTH RECORD

A CHR is a curated set of population-level indicators that describe the health and quality of life of a geographic community, including trends, disparities, and the ability to compare metrics with those of other communities. For example, CHR data may include measures of community access to healthy foods, crime rates, public transportation utility and efficiency, economic factors, and many other measures that are related to health status. CHRs can be used as a public health surveillance tool, a standardized baseline set of data from which public health and other organizations can begin to systematically reengineer their communities to improve health and quality of life.[12] Given the critical nature of CHRs, a standard needs to be set by public and private organizations in an open-consensus forum, to ensure equal access and consistency to good-quality data across all communities nationally. Through previous work in the field, starting points exist, with many of the key data elements and attributes outlined in this commentary.

CHR data must cover a broad spectrum of categories in a community. A representative list is shown in the box on this page. A variety of efforts exist today that call for the need to use community health data and, in some cases, propose data elements that should be considered.[12–15]

TRADITIONAL CLINICAL HEALTH MEASURES AND SOCIAL AND PHYSICAL DETERMINANTS OF HEALTH

Traditional Clinical Health Measures	Social and Physical Determinants of Health
Access to health services	Built environment
Cancer	Economy
Diabetes	Education
Disabilities	Public safety
Exercise, nutrition, weight	Social environment
Family planning	Transportation
Heart disease, stroke	Gender
Immunizations, infectious disease	Gender identity and sexual orientation
Maternal, fetal, infant health	Age
Mental health	Socioeconomic status
Occupational health	Geographic location
Older adults, aging	Race
Oral health	Housing
Prevention, safety	Risk-taking behaviors (e.g., smoking, lack of exercise)
Respiratory diseases	Employment and income
Substance abuse	Air and water quality

Structure

A standard for CHRs must cover not only the data measures but also a common structure for the data to make it consistent across communities and allow for comparability. With a common basis for how CHR data should be expressed, communities can easily configure visualizations and presentations of the data, including dashboards, maps, graphics, and other tools for easy and consistent understanding. These data representations should include information about disparities (age, race/ethnicity, gender, socioeconomic status, sexual orientation, and gender identity), trends over time, and how a community compares with other communities or with benchmarks such as local, state, and national health goals.

Metadata

Another important attribute of CHRs is metadata: information about the data. Metadata are needed to understand and ensure the quality and comparability of the data; for example, distinguishing between when the data were collected and when they are reported. Another factor is what geographic boundaries will be used to report data, such as using current public health jurisdictional boundaries or perhaps allowing for other local boundaries to be used.

Terminology and Vocabulary

Terminology standards are how the elements of the data set are categorized and expressed. Consensus efforts to arrive at a national standard taxonomy and terminology of community health should consider several existing standards with overlapping measures, as well as the work done by the Population Health Subcommittee of the National Committee on Vital and Health Statistics (http://www.ncvhs.hhs.gov/subcommittees-work-grops/subcommittee-on-population-health) and taxonomies such as the Alliance of Information and Referral Systems (http://www.airs.org/i4a/pages/index.cfm?pageid=1). But there is no consensus today for terminology across a nationally agreed upon set of elements for a CHR standard.

Creating Community Health Record Standards

Standards Developing Organizations are organizations accredited by the American National Standards Institute that facilitate the consensus-based creation of standards for industry. The Office of the National Coordinator for Health Information Technology, the CDC, the National Institutes for Health, the Food and Drug Administration, and other bodies under the US Department of Health and Human Services regularly coordinate and support the activities of Standards Developing Organizations as a vehicle for responding to national priorities and setting regulatory framework. Existing health care Standards Developing Organizations such as Health Level Seven[16] and Integrating the Healthcare Enterprise[17] have workgroups focused on public health, which should be consulted in the CHR standard development to ensure compatibility with EHR standards (and future PHR standards).

The CHR standard should align with existing efforts, such as the Institute of Medicine's work around incorporating social and behavioral determinants of health into EHRs.[18] The phase 1 and phase 2 studies are a great springboard for what could become the CHR–EHR intersection; they have made strides to define some of the important categories that can be added to emerging taxonomies of community health.[18–22]

Over time, near real-time aggregation of individual record–level data from EMRs and PHRs may become a powerful source of some data components in CHRs. This needs to be an upfront consideration in the development of CHR standards. For potential future uses of individual-level data updating CHR data sets, the security and privacy of protected health care information need to follow the Health Insurance Portability and Accountability Act (Pub L No. 104–191, 110 Stat 1936 [1996]).

USE OF COMMUNITY HEALTH RECORDS

Once the common language and technical expression of the basic CHR elements have been standardized, opportunity will be rife for the development and configuration of CHR systems that provide crucial profiles of communities. CHRs, like their cousin EHRs and PHRs, could be used for different purposes. Two fundamentally different ways of using CHRs will be for general insights into a certain population (i.e., insights about a group within the community) or, in some cases, for assisting the understanding of, or service for, specific individuals.

Community Health Place-Based or Geographic Insights

Geographic community health data can be presented in a variety of ways, such as numeric tables, color-coded dashboards, geographic information system mapping, and three-dimensional data visualizations. Stakeholders can use these geographic insights to prioritize targeted interventions to small groups and individuals to improve health and quality of life. These can be called "outside-in" level efforts. An example of a place-based or geographic population approach to utilizing CHRs is presented as Figure B (available as a supplement to the online version of this article at http://www.ajph.org). Over time, a knowledge base of effective and cost-effective best practices for community health interventions can be developed that address specific community health profiles. Early versions of these best-practice databases can be found at the CDC's Community Health Improvement Navigator, County Health Rankings's What Works for Health, and the Healthy Communities Institute (http://www.sfhip.org).

Clinical Insights in Defined Populations

A second approach to using CHRs starts by looking at certain individuals or groups (a defined population) within a clinical or other setting, then following them out into the community to provide a more comprehensive and effective prevention or treatment program for the individual (this can be called an "inside-out" approach).

As health care delivery teams provide care and services to individuals, there is an increasing awareness that people need to be treated in a manner that is relevant and effective to their personal beliefs and economic and community circumstances. Informing a single-parent pregnant woman living in poverty that she needs a routine set of prenatal checkups at a location to which she has no available transportation is destined to be ineffective. In this case, CHR data, such as a summary zip code– or census tract–level "vulnerability index," could be integrated into an EHR (for clinicians and allied health professionals) to flag at-risk patients. These indices can provide insights to health professionals of the more complete set of education or services individuals may require for effective prevention and treatment of their medical conditions.

Clinical transformation and community health professionals can work together to use CHR data to gain insights into the health of populations and to reengineer processes and factors that influence health and health care delivery.[13] As organizations begin to take on increasingly more risk for the health of populations (such as with accountable care organizations and other value-based reimbursement changes such as State Innovation Models programs; http://kff.org/medicaid/fact-sheet/the-state-innovation-models-sim-program-an-overview), CHRs can be used, along with traditional clinical data, to prioritize areas of need, drive reengineering process improvement, and improve health. Key to helping with these activities will be continued payment reform, to provide financial incentives that reward improvements in disease management, disease prevention, and health promotion work.

Current Limitations of CHRs

Some of the limitations related to community health data collection and reporting are presented in the box on the next page. By addressing these limitations, we can arrive at a consistent level of good-quality data that are useful and comparable across the United States. As an example, consider County Health Rankings, a wonderful data resource for communities across the United States. However, County Health Rankings reports data at the county level; a county such as San Diego, which is four times larger than the whole state of Rhode Island, is made up of very different communities and geographic environments. The disparities that may be masked by reporting at such a large county geographic level make the data all but useless in gaining insights about the health of groups within the community. Other important limitations include the lack of equivalency in the breadth and quality of data between states and the lack of a standardized way to interface with the data (such as standard applied program interfaces) so that applications and tools can be written to pull data from current CHR-like efforts and provide analytics and better data presentation. These and other issues are further outlined in the box on the next page.

RECOMMENDATIONS

Although a great amount of research and collaboration must yet be done to understand what specific CHR data should be collected, how it should be collected (using innovative and improved methods), and how it should be used, the box on page 411 offers an initial set of recommendations for consideration in the United States. These recommendations consider the need to greatly reduce the

LIMITATIONS RELATED TO CURRENT COMMUNITY HEALTH DATA COLLECTION AND USE

I. Community Health Record Data-Collection and Reporting Limitations

1. There is a lack of standardization for the naming of data elements that would compose a CHR, and for the types of data that should be collected.
2. Consensus is absent around which data sets and indicators are using valid data-collection methods. Consensus would improve reliability of the data and allow for comparison of data sets across different regions. State health departments may be charged with collecting and populating the broad data for CHRs and making them available in their states, but these efforts should not limit local flexibility to add additional indicators and evolve the CHR data standard.
3. CHR data should be reported at the most granular level available; often, data collected today is at state and county levels and lacks zip code– or census tract–level granularity. There should be a concerted effort to collect and report data at the most granular level that is reasonably possible, subject to arriving at validated metrics. Consistency of reported data needs to be established.
4. There is a lack of methods for the interoperability of CHR data, which contributes to the difficulties of comparing data across regions.
5. Data comparisons across communities are not always time-consistent; there is no standardized method for accurate time-stamping of data (such as a date [month–day–year] standard with clear guidelines for when data are collected and reported). For example, two data sources may list a “publish date” of 2014, but the data were collected from different years, which makes data comparability not only difficult but potentially misleading.
6. CHR-level data sources are limited today, but as EHR and PHR data become more prevalent and reach critical mass coverage in certain geographic areas, CHR data may include aggregation of certain EMR–EHR-level and PHR-level data. Therefore, it would be efficient during CHR standard-creation efforts to map to existing clinical data standards when relevant and appropriate.
7. As individuals move from community to community, data may show up in more than one region. Methods are lacking for deduplication of individual data when real-time aggregation of record-level data becomes more viable.

II. Community Health Record Application Limitations

1. There is a lack of standardized summary scores and indexes that allow for rapid and efficient data consumption and use of (what is sometimes voluminous) community health data.
2. Community health data are rarely used today to inform health care delivery strategies, such as clinical quality initiatives. Data are available, but not easily found and not commonly used.
3. Community-level data historically have not been made available to the community in easy-to-use formats, nor are there standard data APIs for application and service developers who could leverage these data to add value and improve community health.

III. Community Health Record Financial Constraints

1. Many communities feel that they lack the financial resources to collect and report community-level health data.
2. States and communities are left to their own discretion as to level of investment in collecting and reporting data; some states charge fees to access the data that have been collected.
3. There are few incentives for community stakeholders to consume and act on community health data (such as community health bonds and other potential methods of providing incentives for mid- and long-range community health planning).

IV. Community Health Record Privacy Limitations

1. Although guidelines exist for HIPAA-compliant de-identification for aggregated data sets, there is the potential risk of identifying individuals through triangulation of aggregated data when data are reported in small numbers and rural areas. Specifically, in the future, when we aggregate EMR and PHR data, this raises concerns of privacy and shows the need for ongoing guidelines for this issue.

Note. API = applied program interface; CHR = community health record; EHR = electronic health record; EMR = electronic medical record; HIPAA = Health Insurance Portability and Accountability Act; PHR = personal health record.

variability in the breadth, granularity, and quality of data available at the local level between states, and to take advantage of the good work already being done with early-stage CHRs in many communities. The goal is to establish a pragmatic path toward defining a CHR standard and improving the health of the population over time.

CONCLUSIONS

Community health data efforts exist informally today, but they lack a common structure or set of standards that would greatly improve their utility. The large number of current community health data efforts and health improvement activities have isolated successes, but they have not been able to benefit from consolidated standards and efficiencies. Important stakeholders such as the Institute of Medicine[23,24] and the Robert Wood Johnson Foundation[25] have published consensus articles and reports to identify and define community health data needs. The present need is to further industry collaboration and federal government prioritization to define a CHR that establishes a community health data standard, one that is usable and interoperable

RECOMMENDATIONS FOR IMPROVING THE HEALTH OF THE POPULATION

1. The ONC, along with others identified by the ONC within the DHHS, should incorporate a CHR into its future Learning Health System and Interoperability Roadmap aims.
2. The ONC should lead the relevant parties and convene a Community Health Record Working Group to identify the groups currently working on community health standards, and harmonize the standards for health and quality-of-life descriptions and measurements that define the baseline CHR.
3. The standards should include data needed to describe national, state, and local health and determinants of health and not simply recommend currently existing national sourced indicators. Place-based data, at an increasingly local granular level (county, city, zip code, tract or block) are needed to properly understand the distribution of health in a community. An investment may be needed to collect these data. As with the evolution of EHR standards, the collection of increasingly geographical granular data may be phased in over time.
4. The ONC should consider using the results of the Community Health Record Working Group to propel the standards for interoperability within existing SDOs upon which the public and private sectors can build, act, and innovate. This should include developing a robust data model of the identified health and health determinant categories.
5. CHR standards should include flexibility for the inclusion of new metrics and data based on the needs and special characteristics of a given region or population; that is, the ability to add local data and have a process for periodic national review of incorporating new data elements into the CHR standards.
6. CHR standards should work toward improving the consistency of data-collection methods across communities to improve data reliability and comparability.
7. The ONC or another government entity should establish a method for sharing best practices related to data collection and reporting among communities and organizations working to improve population health. As an example, this may include guidelines for reporting data, such as the aggregation of data across multiple years to arrive at stable rates. These data-collection and reporting best practices may be developed and encouraged through grants, incentives, technical assistance, rewards and recognition, and competitions. Support should be provided to ensure that CHRs are based on continually improved data sources.
8. The ONC or another government entity should continue the excellent work with the open data initiative, and (1) continue encouraging government agencies and other organizations to release more health and quality-of-life data and (2) continue establishing APIs, exposing access to the data and allowing for more interoperability and data sharing. Also important is enabling third parties and application developers to add value (presentation of data, combination of data sets, higher-level analytics) for those interested in using this information to improve insights into the health of populations.
9. CHR standards should mandate inclusion of standard conventions for time-stamping data (both when collected and when reported) within all published community health data. Furthermore, CHRs should have the capacity to interoperate with other data provenance standards as being spearheaded by the ONC.
10. CHR best practices must be based on community health, broadly defined, and as such should include indicators related to the environment, the economy, education, transportation, and other factors relating to health and quality of life, such as access to fresh food and housing availability.
11. For all relevant federally supported activities, the government should phase in requirements for assessing and using CHR data best practices, such as reporting for hospital IRS 990 requirements and public health department PHAB requirements.
12. Upon formalization of CHR standards, government agencies should require applicable federal grant recipients to use CHR standard data for statements of need and impact assessment.
13. Educational institutions and workforce development programs, such as schools of public health and hospital administration programs, should incorporate CHR training. This will help cultivate a new breed of experts trained in both CHR technology and the application of that technology to drive community health best practices. Coursework should also include basic systems reengineering principles for quality and system improvement.
14. Stakeholders working in the field of population health should work together to increase both the quantity and quality of community health data, including those with government funding for research grants and awards or nonprofit organizations also collecting relevant data.

Note. API = applied program interface; CHR = community health record; DHHS = Department of Health and Human Services; EHR = electronic health record; ONC = Office of the National Coordinator for Health Information Technology; PHAB = Public Health Accreditation Board; SDO = Standards Developing Organization.

with the health and human service ecosystem. The CHR should be the base unit of the community health infrastructure and serve as a public health surveillance system.

Although the purpose of a CHR is to create a baseline data set for each community and allow for the systematic improvement of population health in regions throughout the country, improving population health requires change at the community level. Learning from change theories and process-improvement models will be critical to move community health improvement activities forward. To achieve positive health outcomes, CHR data must be coupled with input from community stakeholders, prioritization techniques, program and policy best practices, coordinated working groups (such as those using Collective Impact[9] methods), improved econometric modeling, and monitoring and evaluation from both the public and private sectors.

There is tremendous opportunity to improve the public's health and lower health care costs in the United States by systematically reengineering our resources and services at the local and regional level. Once CHRs—along with their data elements and structure—are defined, it will be possible to apply more rigorous, agile improvement techniques from systems engineering and process improvement.

As policymakers and community health stakeholders begin to use higher-quality data and tools, the opportunity builds on, and moves beyond, Triple Aim goals.[10] The stakeholders who use CHRs—community planners, health care delivery and insurance stakeholders, public and private organizations, and nongovernmental organizations—will be better supported in decision-making and program planning. Over time, it is expected that the United States will evolve past using only gross domestic product, a principal measure of economic output, and begin to factor in other quality-of-life indexes. CHRs can provide substantial information to support these quality-of-life measures. Eventually, CHRs also can be harmonized with international standards and, over time, afford an opportunity to support global efforts to observe the relationships between geopolitical and health care delivery system measures—at the national and local level—and the output in terms of health, productivity, and quality of life. That study of CHR global data could create a new discipline of data-driven and evidence-based social, economic, and political science research. AJPH

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