

Chapter 1 : Epidemiology - Wikipedia

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Causal inference Although epidemiology is sometimes viewed as a collection of statistical tools used to elucidate the associations of exposures to health outcomes, a deeper understanding of this science is that of discovering causal relationships. For epidemiologists, the key is in the term inference. Correlation, or at least association between two variables, is a necessary but not sufficient criteria for inference that one variable causes the other. Epidemiologists use gathered data and a broad range of biomedical and psychosocial theories in an iterative way to generate or expand theory, to test hypotheses, and to make educated, informed assertions about which relationships are causal, and about exactly how they are causal. Epidemiologists emphasize that the "one cause ⇒ one effect" understanding is a simplistic mis-belief. If a necessary condition can be identified and controlled e. Bradford Hill criteria[edit] Main article: Bradford Hill criteria In , Austin Bradford Hill proposed a series of considerations to help assess evidence of causation, [39] which have come to be commonly known as the " Bradford Hill criteria ". A small association does not mean that there is not a causal effect, though the larger the association, the more likely that it is causal. Consistent findings observed by different persons in different places with different samples strengthens the likelihood of an effect. Causation is likely if a very specific population at a specific site and disease with no other likely explanation. The more specific an association between a factor and an effect is, the bigger the probability of a causal relationship. The effect has to occur after the cause and if there is an expected delay between the cause and expected effect, then the effect must occur after that delay. Greater exposure should generally lead to greater incidence of the effect. However, in some cases, the mere presence of the factor can trigger the effect. In other cases, an inverse proportion is observed: A plausible mechanism between cause and effect is helpful but Hill noted that knowledge of the mechanism is limited by current knowledge. Coherence between epidemiological and laboratory findings increases the likelihood of an effect. However, Hill noted that " The effect of similar factors may be considered. This question, sometimes referred to as specific causation, is beyond the domain of the science of epidemiology. Conversely, it can be and is in some circumstances taken by US courts, in an individual case, to justify an inference that a causal association does exist, based upon a balance of probability. The subdiscipline of forensic epidemiology is directed at the investigation of specific causation of disease or injury in individuals or groups of individuals in instances in which causation is disputed or is unclear, for presentation in legal settings. Population-based health management[edit] Epidemiological practice and the results of epidemiological analysis make a significant contribution to emerging population-based health management frameworks. Population-based health management encompasses the ability to: Modern population-based health management is complex, requiring a multiple set of skills medical, political, technological, mathematical etc. This task requires the forward looking ability of modern risk management approaches that transform health risk factors, incidence, prevalence and mortality statistics derived from epidemiological analysis into management metrics that not only guide how a health system responds to current population health issues, but also how a health system can be managed to better respond to future potential population health issues. Population Life Impacts Simulations: Measurement of the future potential impact of disease upon the population with respect to new disease cases, prevalence, premature death as well as potential years of life lost from disability and death; Labour Force Life Impacts Simulations: Measurement of the future potential impact of disease upon the labour force with respect to new disease cases, prevalence, premature death and potential years of life lost from disability and death; Economic Impacts of Disease Simulations: Measurement of the future potential impact of disease upon private sector disposable income impacts wages, corporate profits, private health care costs and public sector disposable income impacts personal income tax, corporate income tax, consumption taxes, publicly funded health care costs. Applied field epidemiology[edit] Applied epidemiology is the practice of using epidemiological methods to protect or improve the health of a

population. Applied field epidemiology can include investigating communicable and non-communicable disease outbreaks, mortality and morbidity rates, and nutritional status, among other indicators of health, with the purpose of communicating the results to those who can implement appropriate policies or disease control measures. Humanitarian context[edit] As the surveillance and reporting of diseases and other health factors becomes increasingly difficult in humanitarian crisis situations, the methodologies used to report the data are compromised. One study found that less than half Among the mortality surveys, only 3. As nutritional status and mortality rates help indicate the severity of a crisis, the tracking and reporting of these health factors is crucial. Vital registries are usually the most effective ways to collect data, but in humanitarian contexts these registries can be non-existent, unreliable, or inaccessible. As such, mortality is often inaccurately measured using either prospective demographic surveillance or retrospective mortality surveys. Prospective demographic surveillance requires lots of manpower and is difficult to implement in a spread-out population. Retrospective mortality surveys are prone to selection and reporting biases. Other methods are being developed, but are not common practice yet. One way to assess the validity of findings is the ratio of false-positives claimed effects that are not correct to false-negatives studies which fail to support a true effect. To take the field of genetic epidemiology, candidate-gene studies produced over false-positive findings for each false-negative. By contrast genome-wide association appear close to the reverse, with only one false positive for every or more false-negatives. By contrast other epidemiological fields have not required such rigorous reporting and are much less reliable as a result. Random error is just that: It can occur during data collection, coding, transfer, or analysis. Examples of random error include: Random error affects measurement in a transient, inconsistent manner and it is impossible to correct for random error. There is random error in all sampling procedures. This is called sampling error. Precision in epidemiological variables is a measure of random error. Precision is also inversely related to random error, so that to reduce random error is to increase precision. Confidence intervals are computed to demonstrate the precision of relative risk estimates. The narrower the confidence interval, the more precise the relative risk estimate. There are two basic ways to reduce random error in an epidemiological study. The first is to increase the sample size of the study. In other words, add more subjects to your study. The second is to reduce the variability in measurement in the study. This might be accomplished by using a more precise measuring device or by increasing the number of measurements. Note, that if sample size or number of measurements are increased, or a more precise measuring tool is purchased, the costs of the study are usually increased. There is usually an uneasy balance between the need for adequate precision and the practical issue of study cost. Systematic error[edit] A systematic error or bias occurs when there is a difference between the true value in the population and the observed value in the study from any cause other than sampling variability. An example of systematic error is if, unknown to you, the pulse oximeter you are using is set incorrectly and adds two points to the true value each time a measurement is taken. The measuring device could be precise but not accurate. Because the error happens in every instance, it is systematic. Conclusions you draw based on that data will still be incorrect. But the error can be reproduced in the future e. A mistake in coding that affects all responses for that particular question is another example of a systematic error. The validity of a study is dependent on the degree of systematic error. Validity is usually separated into two components: Internal validity is dependent on the amount of error in measurements, including exposure, disease, and the associations between these variables. Good internal validity implies a lack of error in measurement and suggests that inferences may be drawn at least as they pertain to the subjects under study. External validity pertains to the process of generalizing the findings of the study to the population from which the sample was drawn or even beyond that population to a more universal statement. This requires an understanding of which conditions are relevant or irrelevant to the generalization. Internal validity is clearly a prerequisite for external validity. Selection bias[edit] Selection bias occurs when study subjects are selected or become part of the study as a result of a third, unmeasured variable which is associated with both the exposure and outcome of interest. Sackett D cites the example of Seltzer et al. Information bias[edit] Information bias is bias arising from systematic error in the assessment of a variable. A typical example is again provided by Sackett in his discussion of a study examining the effect of specific exposures on fetal health: Confounding[edit] Confounding has traditionally been defined as bias

arising from the co-occurrence or mixing of effects of extraneous factors, referred to as confounders, with the main effects of interest. The counterfactual or unobserved risk RA_0 corresponds to the risk which would have been observed if these same individuals had been unexposed. The true effect of exposure therefore is: Since the counterfactual risk RA_0 is unobservable we approximate it using a second population B and we actually measure the following relations: Example assumes binary outcome and exposure variables. Some epidemiologists prefer to think of confounding separately from common categorizations of bias since, unlike selection and information bias, confounding stems from real causal effects. One notable undergraduate program exists at Johns Hopkins University, where students who major in public health can take graduate level courses, including epidemiology, their senior year at the Bloomberg School of Public Health. Many other graduate programs, e. Reflecting the strong historical tie between epidemiology and medicine, formal training programs may be set in either schools of public health and medical schools. Epidemiologists can also work in for-profit organizations such as pharmaceutical and medical device companies in groups such as market research or clinical development.

Chapter 2 : The HIV care cascade: models, measures and moving forward

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Both work by comparing different parts of a frame of video to find areas that are redundant, both within a single frame as well as subsequent frames. These redundant areas are then replaced with a short description instead of the original pixels. Effective use of these improvements requires much more signal processing capability for compressing the video, but has less impact on the amount of computation needed for decompression. Extensions for 3D video 3D-HEVC were completed in early , and extensions for screen content coding SCC were completed in early and published in early , covering video containing rendered graphics, text, or animation as well as or instead of camera-captured video scenes. In October , the standard was recognized by a Primetime Emmy Engineering Award as having had a material effect on the technology of television. The combined licensing fees currently offered by all of the patent licensing bodies are higher than for AVC. A software codebase called the KTA codebase was established for evaluating such proposals. Additional proposed technologies were integrated into the KTA software and tested in experiment evaluations over the next four years. The project had tentative names H. A total of 27 full proposals were submitted. MPEG LA does not charge any fee on the content itself, something they had attempted when initially licensing AVC, but subsequently dropped when content producers refused to pay it. Speculation at the time was that these companies would form their own licensing pool to compete with or add to the MPEG LA pool. Region 2 countries are countries not listed in the Region 1 country list. This led to calls for "content owners [to] band together and agree not to license from HEVC Advance". Coding efficiency is the ability to encode video at the lowest possible bit rate while maintaining a certain level of video quality. There are two standard ways to measure the coding efficiency of a video coding standard, which are to use an objective metric, such as peak signal-to-noise ratio PSNR , or to use subjective assessment of video quality. Subjective assessment of video quality is considered to be the most important way to measure a video coding standard since humans perceive video quality subjectively. The tests showed that large CTU sizes increase coding efficiency while also reducing decoding time. The video encoding was done for entertainment applications and twelve different bitrates were made for the nine video test sequences with a HM The video encoding was done for entertainment applications and four different bitrates were made for nine video test sequences with a HM The subjective assessment was done at an earlier date than the PSNR comparison and so it used an earlier version of the HEVC encoder that had slightly lower performance. The bit rate reductions were determined based on subjective assessment using mean opinion score values. The five second video sequences showed people on a street, traffic, and a scene from the open source computer animated movie Sintel. The video sequences were encoded at five different bitrates using the HM The subjective bit rate reductions were determined based on subjective assessment using mean opinion score values. The video sequences were encoded using the HM In a video encoder comparison released in December , the HM In the comparison, the HM

Chapter 3 : Raspberry Pi - Wikipedia

Introduction. The advent of antiretroviral therapy (ART) was meant to change the course of the AIDS epidemic. In many ways it did: there was a dramatic reduction in AIDS-related morbidity and mortality, and in some contexts HIV/AIDS is now a manageable chronic illness.

Late enrolment is defined in relation to the time between HIV diagnosis and presentation to a wide range of HIV-related services including enrolment, CD4 evaluation and treatment initiation. Different retention measures and their association with the likelihood of individuals achieving viral suppression have been employed [25 – 28]. Late treatment is measured multiple ways. Open in a separate window HIV testing is generally measured by the percentage of people who are tested for HIV in a given population. Although measures defining late testing in relation to AIDS diagnosis on average would reflect late testing, fast and slow progressors exist, which may limit the effectiveness of these definitions. Despite this potential limitation, these measures appear to be the best proxy measure of late testing at this time. An ideal measure would evaluate the time from HIV infection to diagnosis. The WHO has established a technical working group to develop an incidence assay that would define recent infection at the time of testing; however, such technology is currently only available at a population level and cannot estimate individual infection time [29]. Point-of-care CD4 testing could also provide a practical alternative to more effectively measure late testing. Linkage or enrolment is commonly evaluated as the percentage of people who have been diagnosed with HIV that enrolled in care. Late enrolment is defined in relation to the time between HIV diagnosis and presentation to a wide range of HIV-related services, including enrolment, CD4 evaluation and treatment initiation. Recent studies have begun to quantify the relationship between different retention measures and their association with the likelihood of individuals achieving viral suppression [25 – 28]. Although these findings may provide useful insights for the evaluation of late enrolment, global guidelines have yet to make clear statements regarding important thresholds by which a patient should enrol in care. Furthermore, differences in service provision for example, CD4 evaluation prior to or following enrolment in HIV-related services as well as differences in the package of what constitutes care such as treatment regardless of CD4 vs. As ART has become more widely available, the percentage of people on ART has been used as the catchall measure reflecting successful engagement in care. Late treatment initiation has been measured in several different ways. However, as research on HIV treatment continues to suggest that earlier initiation of treatment can prevent disease progression, limit damage to organ systems and minimize the risk of transmission, CD4 cell count may play less of a role in the decision to initiate treatment, particularly in high-income settings. Viral load suppression, the desired outcome of timely advancement along the cascade, is also inconsistently defined. At this time, WHO guidelines for high-, low-, and middle-income countries could be used to standardize measures for achieving viral suppression. By using a range of cost-effective techniques, point-of-care viral load testing could be expanded in limited resource settings and offer opportunities to standardize measures [30]. Specifically, expanding viral load testing may help determine if distinct viral RNA thresholds across economic contexts are appropriate. Conclusions Our review of several models and their associated measures highlights major differences and areas for further clarification within the cascade. Point-of-care CD4 count tests could substantially improve our ability to measure what constitutes late presentation to a range of services, though as evidence mounts in support of earlier treatment initiation, the importance of CD4 evaluations may be further diminished [31]. WHO now recommends viral load testing as the preferred approach to monitoring ART success and diagnosing treatment failure; thus, if access to viral load testing does in fact increase [30], it might become a more useful measure for assessing delays in uptake of HIV testing and treatment initiation as well as determining when viral suppression is achieved. Although this article focuses on differences between global and national guidelines, there are also differences at the local level to be discussed. For example, some health departments have developed best practices, including same day appointments along with transportation and peer support when needed, which has been shown to increase the likelihood of enrolment [32]. In other settings, all people living with HIV attending HIV care services are

provided co-trimoxazole prophylaxis, which may serve as a motivator for people who are not yet ART-eligible to remain engaged in care [33]. As such, consideration of locally implemented guidelines may also help identify strategies that promote timely access and continued engagement in care. Our final points perhaps lead to the next step in considering how the cascade is conceptualized more broadly. Currently, models are presented as linear such that a patient, once testing positive, ideally transitions to the next stage of care. However, stages along the cascade must be repeated: HIV testing for those who test negative requires HIV-negative people to stay engaged in care; CD4 count and viral load testing for those who test positive should be repeated regularly. In addition, many patients cycle in and out of care over the life course [34]. Re-presentation to care after initial loss to follow up is one of the most challenging aspects of the cascade to measure, and future work should seek to develop retention metrics that can be adapted to capture this complexity across settings. Furthermore, efforts to situate the cascade within the larger context of primary care may reinforce attempts to routinize HIV counselling and testing and to ensure that the comprehensive health needs of HIV-positive patients are met. Ultimately, a closer look at the differences among models and measures of the cascade will help identify how practitioners can best deliver services. Only in so doing do we have a chance to not only change the course of this epidemic but to halt it. Competing interests The authors declare that they have no competing interests. All authors have read and approved the final manuscript. The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med. Department of Health and Human Services. Late diagnosis, delayed presentation and late presentation in HIV: Rosen S, Fox MP. Loss to programme between HIV diagnosis and initiation of antiretroviral therapy in sub-Saharan Africa: Trop Med Int Health. HIV in the United States: HIV prevention through care and treatment. British HIV Association; Standards of care for people living with HIV Brazilian Ministry of Health. World Health Organization; Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: Viral suppression after 12 months of antiretroviral therapy in low- and middle-income countries: Bull World Health Organ. Handbook for guideline development. Correlates of late HIV diagnosis: Late diagnosis of HIV infection: Delayed diagnosis of HIV infection in a multicenter cohort: A comparison study of methods for measuring retention in HIV medical care. Accuracy of definitions for linkage to care in persons living with HIV. J Acquir Immune Defic Syndr. Measuring retention in HIV care: Retention in care is more strongly associated with viral suppression in HIV-infected patients with lower versus higher CD4 counts. Technical update on HIV incidence assays for surveillance and epidemic monitoring. Can we provide point-of-care viral load tests in poor countries? March Supplement to the Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection. Implementation of free cotrimoxazole prophylaxis improves clinic retention among antiretroviral therapy-ineligible clients in Kenya. Using the side door:

period between 2 and 4 years is particularly dramatic, highlighted by the emergence of Monogr Soc Res Child Dev. Author manuscript; available in PMC May

In tragedy the individual one person or a group is overwhelmed; in comedy the individual triumphs. In tragedy, as in comedy, five stages may be noted in the plot development: Let it not be thought for a moment that each of these stages is clearly differentiated. As a rule they pass insensibly into each other, as they do in life. Especially is this true in a play like *Romeo and Juliet*, where the weaving of the plot is so close and compact. The Prologue briefly gives the setting and theme of the play and prepares us for a drama of pathos in which the destiny of two lovers is determined by fate and external circumstances, rather than by character. Act I, Scene i. The thread of the feud action is here introduced with the peace-making Benvolio on the side of the Montagues and the fiery Tybalt on the Capulet side. This warning is a preparation for the tragic climax. The love action is suggested. When Romeo enters, it is soon discovered that the cause is unrequited love. Act I, Scene ii. The entrance of Juliet is prepared for; County Paris is a claimant for her hand. Romeo consents to attend the Capulet masquerade. In the chance meeting of Romeo and Benvolio by the servant as he sets out to invite guests to the feast may be read the significance of the part played by accident in determining the outcome of the play. Act I, Scene iii. Lady Capulet announces to her daughter in the presence of the garrulous nurse that Paris is seeking her in marriage and that she is to meet him that night at the feast. Act I, Scene iv. Mercutio joins with Benvolio in urging the reluctant Romeo to forget his sad love affair and to enter into the spirit of the feast. The feast is on. Romeo catches sight of Juliet and immediately is in love with her. Already the counteracting forces are at work. Tybalt, the chief antagonist, hearing his voice, recognizes him and is enraged that a Montague should dare attend a Capulet feast. He leaves the hall with a determination to punish this intrusion. This is the motive to the complication of the feud action. Romeo and Juliet meet, love at sight, and part; and the dramatic entanglement has begun. Act II, Scene i. Act II, Scene ii. By a masterly device the usual delays attending lovemaking are removed and the dramatic interest and entanglement intensified. By chance, again, Juliet in her confession of love to the heavens and the night is overheard by her lover himself, and he comes to her call. In this, the famous balcony scene, the lovers plan marriage. Through the scene are scattered presentiments of evil. Act II, Scene iii. The soliloquy of the Friar reflects the doom that awaits the love of Romeo and Juliet, while his knowledge of herbs prepares us for his later intrigue. He promises reluctantly to officiate at a secret wedding and sees in this union a possible reconciliation between the hostile houses. The scene ends with the significant words: The first part of this scene, where it is revealed that Tybalt has sent a challenge to Romeo, prepares us for the crossing of the feud action and love action. It also furnishes an opportunity for Mercutio to express his disdain of Tybalt. The second part completes the arrangement for the marriage. Act II, Scene v. Act II, Scene vi. The marriage rite is performed, but even this joyous scene is not without its warning lines: These violent delights have violent ends And in their triumph die. The threads of the feud action and the love action cross each other. Tybalt in seeking out Romeo comes upon Mercutio, who exchanges daring words with him. By chance, Romeo comes that way. Tybalt calls him "villain," but he controls his anger at this insult out of respect to his secret new alliance with a Capulet. The hot-blooded Mercutio is angered at what seems to be a vile submission and takes up the fight. Romeo and Benvolio come between them, but Tybalt strikes Mercutio a last revengeful blow and then runs off. The blow is fatal and the death of his friend rouses Romeo to revenge. Citizens and members of the two houses gather. The Prince hears an account of what has taken place and Romeo is sentenced to banishment. After she has become almost distracted with confusion and despair, the Nurse finally says that she knows where Romeo is hid, and goes to take him a ring from Juliet and ask him to come that night to take his last farewell. Act III, Scene iii. When Romeo hears his sentence of banishment he gives way to despair. What the philosophy of Friar Laurence fails to do in the way of comfort is effected by the message from Juliet. The Friar warns him to depart by break of day for Mantua and promises to keep him informed of happenings in Verona. Act III, Scene iv. The action of the Paris love suit begins to take definite shape. Capulet sets the following Thursday as the wedding day of his

daughter and the county. Act III, Scene v. The lovers bid farewell and the shadow of the tragic catastrophe falls on their parting words. Hardly has Romeo escaped, when Lady Capulet comes in to tell Juliet of the wedding to take place on Thursday. The enmity of the family now concentrated on Romeo as the slayer of Tybalt makes it impossible for Juliet to confess her marriage. She pleads for time, but her angered father bursts forth in abuses, her mother turns a deaf ear, and even the Nurse fails her in her time of greatest need. Her only hope is in the Friar and to him she resolves to go. Act IV, Scene i. The Friar suggests a daring intrigue by which Juliet shall take a drug that will make her appear dead for forty-eight hours. This will relieve her from her marriage to Paris and will afford an opportunity for Romeo to take her shortly away to Mantua. Act IV, Scene ii. She feigns willing submission and seems eager for the day. Act IV, Scene iii. After cheerfully attending to the preparations for her wedding, Juliet asks to be left alone for the night that she may pray. In spite of terrifying misgivings and fears, she drinks the potion. The intrigue of the Friar is begun. Act IV, Scene iv. A scene of irony and suspense. The household is astir preparing the trappings of the feast, the bridegroom is at hand, but the bride cannot be found. Act IV, Scene v. The drug has produced the semblance of death and the wedding feast is turned into a funeral. Act V, Scene i. The scene shifts to Mantua. After Romeo has determined to be with Juliet that night in the monument, and has, by bribing a poverty-stricken apothecary, procured the means in the shape of an instant-working deadly drug, all seems lost — yet a slight hope remains that chance will intervene and avert the tragic end. Act V, Scene ii. Again accident has proved the enemy of the lovers, for just as the messenger was about to depart for Mantua, the doors of the house at which he stayed were sealed because of the pestilence. As Friar Laurence hastens to the tomb to be present when Juliet awakes, there is a hope that he may arrive in time to meet Romeo and stay his death. Chance is hostile to the end and drags down not only the two lovers but Paris as well. After this tragic ending of the love action and the feud action, the Friar explains the marriage and intrigue. His words are supplemented by the letter that Romeo leaves with Balthasar. At last the family feud is ended by the death of the star-crossed lovers. How to cite this article:

Chapter 5 : High Efficiency Video Coding - Wikipedia

1. Introduction. Translational research is often thought of as the translation of discoveries made at the bench to clinical practice. Less appreciated forms of translational research are observations of clinician scientists that form foundations for new paradigms in basic research.

Comparative and international education; Poverty and education; Child welfare; Educational policy. Urban education; Identity construction in school contexts; Urban school transformation. Higher education administration and governance, online blended education, instructional design and educational technology, program assessment and evaluation. Leadership, supervision, and capacity development. Leadership; Sociological explorations of emotions occurring in organizational contexts; Organizational development; Contextual issues confronting organizations, such as organizational leadership, organizational culture, and communities of practice. Higher education leadership and administration. Comparative and international education, education of ethnic and linguistic minorities, sociology of education. Identifying the variables that influence adult behavior change in community settings; autism intervention; widespread dissemination of evidence-based interventions in school and community settings. Global and international education Salvatore V. Human Resource intelligence i. Educational psychology and educational technology, especially the following: Educational leadership and management. Mentoring and leader development, workplace Incivility, workplace learning and development. Civic engagement, college student identity development, indigenous higher education, comparative higher education access policies. Change leadership, curriculum re-design, the impact of technology on learning. Undergraduate studies, science education, curriculum design. Urban education; science education; genetics; gender equity; science knowledge for conceptual teaching; sport science. Teen and young adult job access; economic outlook, college labor market; workforce development, planning, and development; vocational rehabilitation and job market transition. Educational field coordinator, instructional design, qualitative evaluation, writing across the curriculum. Early childhood education, social and emotional learning, child guidance strategies, effects of public pre-school attendance. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia. Educational policy, school law, public-private partnerships, intersection of business and education. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education. Curriculum and instruction K; teaching English as a foreign language TEFL ; instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy Kathleen Provinzano, PhD Marywood University. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy. Design of computer-based learning environments; Human-computer interaction; Design sciences. Sondergeld, PhD University of Toledo. Early literacy development, learning differences, knowledge construction, urban education. Emphasis in cross-cultural, language and academic development. Educational psychology, school psychology, research design. Behavior analysis, single subject research methods, functional analysis.