ANNALS OF FAMILY MEDICINE

Online Supplementary Material

Saultz JW, Lochner J. Interpersonal continuity of care and care outcomes. *Ann Fam Med.* 2005;3:159-166.

http://www.annfammed.org/cgi/content/full/3/2/159/DC1

Supplemental Table 1. Summary of Studies Examining Interpersonal Continuity and Care Outcome

Study	Study Method	Setting	Outcome Measured	Outcome Significantly Improved?	Findings	Overall Quality of Evidence
Weiss & Bluestein, 1996[45]	Retrospective cohort	Face-to-face survey of 8,068 Medicare beneficiaries	1. Hospitalization rate 2. Preventive care	1. + 2. + -	Longer duration relationship with the physician correlated with decreased hospitalization and increased influenza immunization. Mammography rate, obesity, and tobacco use did not correlate with duration of continuity	9.5
Charney et al, 1967[21]	Prospective cohort	459 children who received penicillin prescriptions from 3 private pediatric practices in New York	1. Antibiotic compliance	1. + -	Children were significantly more likely to have penicillin in their urine specimen if the prescription was written by their regular doctor than if written by the regular doctor's partner. Compliance correlated with duration of physician-patient relationship for pharyngitis, but not otitis media patients	9
Mainous et al, 1998[48]	Retrospective cohort	Analysis of claims data for 13,495 Delaware Medicaid patients	1. Hospitalization rate	1. +	Provider continuity was associated with significantly lower likelihood of hospitalization than with site continuity only	9
Wasson et al, 1984[33]	Clinical trial	Randomly assigned 776 men > 55 y at a Veterans Administration (VA) clinic to a continuity clinic or an outpatient clinic without continuity	1. Emergent hospitalization rate 2. ICU days 3. Hospital length of stay	1. + 2. + 3. +	Over an 18-mo period, patients in the continuity group had better continuity of care, fewer emergency hospitalizations, fewer ICU hospital days, and shorter lengths of hospital stay	9

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Study	Study Method	Setting	Outcome Measured	Outcome Significantly Improved?	Findings	Overall Quality of Evidence
Boss & Timbrook, 2001[54]	Retrospective cohort	40 low-income women in Indiana received prenatal care with continuity and were compared with 454 women who received prenatal care with poor continuity	1. Neonatal morbidity 2. Apgar score 3. Birth weight	1. + 2. + 3. +	Continuity group had more prenatal visits, higher birth weight, and better Apgar scores. Multivariate analysis showed continuity correlated with higher visit frequency, but higher visit frequency correlated best with improved birth outcomes	9
Christakis et al, 2000[52]	Retrospective cohort	11,233 children continuously enrolled in an HMO in Seattle from birth to age 15 mo	1. Timeliness of childhood immunizations	1. +	Higher continuity scores predicted the delivery of childhood immunization by age 15 mo	9
Christakis et al, 2001[53]	Retrospective cohort	Analysis of claims data from 46,097 pediatric patients in Seattle, Wash	1. Risk of hospitalization	1. +	Children with the highest provider continuity were least likely to be hospitalized	9
Ettlinger & Freemen, 1981[31]	Correlation	119 patients who received an antibiotic prescription from a British general practitioner	1. Antibiotic compliance	1. +	Compliance with medication use correlated significantly with patient reports of knowing prescribing physician well	8.5
Gill & Mainous, 1998[47]	Retrospective cohort	Analysis of claims data for 13,495 Delaware Medicaid patients	1. Hospitalization for all conditions and ambulatory sensitive conditions	1. +	Provider continuity was associated with decreased likelihood of hospitalization	8.5
Sturmberg & Schattner, 2001[59]	Correlation	Audit of 254 patient medical records from general practices in Australia	1. Documentation of health information in medical record	1. +	Interpersonal continuity correlated with improved documentation of problems treated and preventive issues discussed in the medical record	8.5
Overland et al, 2001[58]	Correlation	479 patients attending a diabetes center in Australia	1. HbA_{1C} 2. Lipid control 3. Blood pressure control 4. Presence of diabetic complications	1. - 2. - 3. - 4. -	Glucose, blood pressure, lipid control, and diabetic complication rate did not significantly correlate with duration of provider continuity. Older patients who had more complicating illnesses were more likely to have longer continuity duration	8.5
Hanninen & Takala, 2001[56]	Correlation	260 type 2 diabetic patients in Finland	1. Health-related quality of life 2. Blood glucose control	1. + 2. - *	Provider continuity associated with higher well-being scores on health-related quality of life, but with poorer glucose control as measured by HbA_{1C}	8.5

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Study	Study Method	Setting	Outcome Measured	Outcome Significantly Improved?	Findings	Overall Quality of Evidence
O'Connor et al, 1998[49]	Retrospective cohort	1,387 diabetic patients enrolled for at least 1 year in an HMO in Minnesota	1. Recommended diabetes care measures 2. Glucose control	1. + 2. + -	After controlling for case mix, diabetics with a regular provider were more likely to receive recommended diabetic care and had a lower likelihood of HbA_{1C} >10. Average hemoglobin A_{1C} levels did not significantly correlate with provider continuity	8.5
Lambrew et al, 1996[44]	Correlation	1987 National Medical Expenditure Survey data set of 30,012 patients	1. Access to preventive and primary care services	1. +	Patients with any regular source of care had better access to preventive care than those who did not. Patients with a regular physician had better access than those with a regular site of care, but this difference was found only for patients receiving care in physician offices, clinics, or HMOs as opposed to walk-in clinics and emergency departments	8.5
Gill et al, 2002[60]	Retrospective cohort	187 pregnant Delaware Medicaid patients and their newborns	1. Childhood immunization rates	1. +	Babies were more likely to receive timely immunizations if they received care from the provider who cared for their mothers during prenatal period	8.5
Flocke et al, 1997[6]	Correlation	1839 patients from the practices of 138 community-based primary care physicians in Ohio	1. Quality of primary care based on 20 item patient survey	1. +	Patients forced to change physicians by health plans had significantly lower scores on 5 of 5 indicators of primary care quality	8
O'Malley et al, 1997[46]	Correlation	1,420 multiethnic women from New York who were surveyed by telephone	1. Pap tests 2. Mammogram rate 3. Breast exams	1. + 2. + 3. +	Papanicolaou (Pap) tests, mammograms, and breast examinations were performed significantly more often in patients with a usual site of care and most often in those with a regular clinician	8
Mainous et al, 2001[57]	Correlation	Survey of 418 US patients and 650 patients in the UK examining correlates with patients' trust in their physicians	1. Trust in the doctor-patient relationship	1. +	Trust correlated with the duration of relationship with a usual provider but not with the usual provider continuity index (UPC)	7.5

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Study	Study Method	Setting	Outcome Measured	Outcome Significantly Improved?	Findings	Overall Quality of Evidence
Alpert et al, 1968[22]	Clinical trial	250 low-income families were assigned to a comprehensive, family-focused pediatric clinic and 239 families were assigned to a control group for a 3-y period	1. Rate of hospitalization 2. Surgical operation 3. Well-child visits 4. Illness visits	1. + - 2. + - 3. + 4. +	Comprehensive clinic patients had higher rates of hospitalization and surgical operation in the first 6 mo, but control group patients had a higher rate of both after the first 6 mo. Well-child visits and illness visits were significantly more common in the continuity clinic. Continuity of care was not measured in either group	7.5
Gordis & Markowitz, 1971[24]	Clinical trial	220 infants of primiparous adolescents in Baltimore were assigned to either a comprehensive pediatric clinic or a walk-in clinic	1. Compliance with antibiotic therapy 2. Immunization use in children	1. – 2. + -	No significant difference was noted in immunization rate or antibiotic compliance based on clinic assignment. Only polio vaccination by age 1 y was significantly better in the continuity clinic. Continuity was not measured in either clinic	7
Ettner, 1999[50]	Correlation	Telephone and mail survey of 3,140 adults from the Mid-life in the US study	1. Preventive visits 2. Health behaviors	1. + 2. + -	Patients with a self-reported usual physician were significantly more likely to have a preventive care visit during the past year, were less likely to report substance abuse behaviors, were more likely to have stopped smoking. There was no difference in obesity rates	7
Susman et al, 1989[36]	Prospective cohort	335 consecutive patients transfers from a nursing home to a hospital in Lancaster, Penn	1. Outcome and functional ability of elderly patients transferred from a nursing home to the hospital	1. -	No association was found between functional status or care outcome and continuity of provider between nursing home and hospital	7
Ettner, 1996[43]	Correlation	17,110 children and 23,488 women from 1990 National Health Interview Survey	1. Pap tests 2. Mammogram rate 3. Breast exams 4. Well-child visits 5. Blood pressure checks in women	1. + 2. + 3. + 4. - 5. -	Having a usual source of care significantly correlated with improved rates of Pap smears, mammograms, and breast exams, but not with well-child visits or blood pressure checks in women	7

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Study	Study Method	Setting	Outcome Measured	Outcome Significantly Improved?	Findings	Overall Quality of Evidence
Flynn, 1985[35]	Correlation	61 pregnant patients in a US university-based family practice clinic	1. Pregnancy complications	1. -	No significant relationship between measurements of continuity and perinatal outcomes	6.5
Phillips & Shear, 1984[34]	Correlation	46 hypertension patients receiving care in either a family practice or specialty clinic in California	1. Hypertension control	1. +	Significantly fewer elevated blood pressure readings were found with increasing continuity scores	6.5
Sweeney & Gray, 1995[42]	Case control	110 British general practice patients who did not receive continuity of care case-matched to a control group with continuity	1. Presence of depression 2. Relationship problems 3. Difficult consultations	1. + 2. + 3. +	Poor continuity patients were more likely to have depression, marital problems, family violence, vaginal discharge, non-cardiac chest pain, parent-child relationship problems, and difficult consultations with the physician	6.5
Alpert et al, 1976[29]	Clinical trial	Randomly assigned 931 low-income children in 750 Boston families to receive care in a comprehensive pediatric clinic, a no-contact control group, or a control group that was interviewed along with the experimental group every 6 mo	1. Rate of hospitalization 2. Rate of surgical procedures 3. Illness visits 4. Preventive visits in children	1. + 2. + 3. + 4. +	Children in the experimental group were significantly more likely to receive immunizations and preventive visits, were hospitalized less often, had fewer illness visits, and required fewer surgical procedures, although these rates were not analyzed for statistical significance. Continuity was not measured In any group	6.5
Hjortdahl, 1992[37]	Correlation	Survey of 30 consecutive visits with 133 Norwegian general practitioners	1. Physician knowledge of and sense of responsibility for their patients	1. +	Physicians reported greater knowledge of patients and a greater sense of responsibility for patients as duration of relationship and frequency of visits increased. Visit frequency correlated more strongly with outcomes than relationship duration	6.5
Becker et al, 1974[26,27]	Clinical trial	Randomly assigned 125 low-income pediatric patients to either a clinic with continuity or a walk-in clinic. Both clinic staff and mothers were blinded to the study design	1. Quality of doctor-patient relationship 2. Likelihood of reporting behavioral problems 3. Patient perceptions of quality 4. Immunization rates	1. + 2. + 3. + 4. -	Patients receiving care in continuity clinic were significantly more likely to report behavioral problems to the provider, rated quality of care and quality of doctor-patient relationship higher, and scored higher on an index of health motivation. No significant difference in immunization rates. Continuity of care was not measured in either group	6

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Study	Study Method	Setting	Outcome Measured	Outcome Significantly Improved?	Findings	Overall Quality of Evidence
Gallagher et al, 2001[55]	Correlation	Mail survey of 1,007 women aged 40 to 69 y in a Connecticut managed care network	1. Counseling about hormone replacement therapy	1. - *	Women receiving care from both a family physician-internists and an obstetrician were more likely to receive counseling than women seeing only 1 provider	5.5
Shear et al, 1983[32]	Retrospective cohort	160 women from 3 family practice clinics and an obstetric clinic who gave birth at a hospital in California	1. Birth weight 2. NICU admissions 3. Apgar scores 4. Cesarean rate 5. Labor augmentation 6. Length of labor 7. Hospital length of stay	1. + 2. - 3. - 4. - 5. - 6. - 7. -	Family practice clinics had higher clinician continuity and significantly higher birth weights, but no significant difference in NICU admissions, Apgar scores, cesarean section rate, labor augmentation, length of labor, or hospital length of stay	5
Alpert et al, 1970[23]	Clinical trial	Randomly assigned 931 low-income children in 750 families to receive care in a comprehensive pediatric clinic, a no-contact control group, or a control group that was interviewed along with the experimental group every 6 mo	1. Quality of decision making by mothers regarding case scenarios	1. +	Increased theoretical use of primary care physicians for common medical problems and use of telephone advice or first contact with primary care was observed in the comprehensive clinic. Continuity of care not measured in either group	5
Petersen et al, 1994[39]	Case control	3,146 patients admitted to a Boston teaching hospital internal medicine service	1. Adverse events in hospitalized patients	1. +	Preventable medical errors were 3.5 times more common when a “covering team” was caring for patients	4.5
Howie et al, 1999[51]	Correlation	Survey of 25,994 adults attending 53 practices in 4 regions of England	1. Degree of patient enablement	1. +	Patient enablement correlated with how well the patient knew the doctor as measured by patient survey	4.5
Freeman & Richards, 1994[38]	Correlation	Survey of 99 patients with active epilepsy	1. Likelihood of discussing personally important issues about epilepsy with physician 2. Quality of doctor-patient relationship	1. – 2. +	Physician continuity correlated with patient assessment of the doctor-patient relationship, but not with the likelihood of discussing epilepsy care	4.5

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Study	Study Method	Setting	Outcome Measured	Outcome Significantly Improved?	Findings	Overall Quality of Evidence
Gordis, 1973[25]	Retrospective cohort	Children < 14 y in inner-city Baltimore, Md, neighborhoods with and without comprehensive pediatric care clinics	1. Rheumatic fever incidence	1. +	Rheumatic fever incidence dropped significantly in census tracts served by comprehensive primary care clinics but was unchanged in other areas of the city within the first 8 years the clinics existed. Continuity of care was not measured in either group	4.5
Roos et al, 1980[30]	Retrospective cohort	Claims analysis of 2,974 patients from Manitoba, Canada, referred for tonsillectomy	1. Presence or absence of appropriate preoperative indications for tonsillectomy in children	1. -	There was no significant relationship between continuity and appropriate referral criteria	4
Rowley et al, 1995[40]	Clinical trial	Randomly assigned 405 pregnant Australian women to receive care from a continuity clinic staffed by 6 midwives and 409 women to a university teaching clinic without continuity	1. Prenatal visits 2. Intervention at delivery 3. Newborn resuscitation 4. Apgar score 5. Birth weight 6. Newborn mortality	1. + 2. + 3. + 4. - 5. - 6. -	Continuity clinic patients were more likely to attend prenatal classes and to give birth without intervention. Babies from continuity clinic required less newborn resuscitation, but had similar 5-minute Apgar scores. Newborn mortality rates and birth weights were not significantly different. Continuity of care was not measured in either group	4
Starfield et al, 1976[28]	Correlation	At least 200 follow-up patient visits in each of 3 adult and 3 pediatric clinics in Baltimore, Md	1. Recognition of clinically important information during follow-up primary care visits	1. +	Physicians who followed up their own initial visit were significantly more likely to record important medical information than those who were following up on patients initially seen by another physician	3
Smith, 1995[41]	Prospective cohort	Analysis before and after a VA internal medicine clinic was reorganized into ambulatory teams	1. Readmission within 10 days after hospital discharge	1. +	Readmission decreased by 28% after the change as team continuity improved after the reorganization	3

ICU = intensive care unit; HMO = health maintenance organization; NICU = neonatal intensive care unit.

+ = Outcome significantly improved with interpersonal continuity; - = Outcome not significantly improved with interpersonal continuity; -* = Outcome significantly worse with interpersonal continuity.