

Bundling Clinical Preventive Services: A Review of Definitions and Concepts from the Literature

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1. Objective

“Bundling” in general terms means combining several objects or a quantity of material. It is widely used in the private sector as a tool to attract consumers by offering multiple items purchased together at a lower cost than the same items purchased individually.

The concept of bundling is also used in the provision of health care. The objective of this paper was to review how the term “bundling” has been used in published literature in the context of clinical preventive services. This paper is not intended to be an exhaustive, systematic review of all published literature on the subject, but rather an exploratory effort.

2. Method

A PubMed search was conducted on October 10, 2013. Variations on the word “bundle” (bundling, bundled) were used in conjunction with such terms as clinical care, preventive services, prevention, and testing (details follow). All hits were subjected to a three-stage review, which included the examination of the title, abstract, and full paper. At each stage, only relevant articles were retained. The rejected articles were roughly classified into a few groups based on the title. Bibliographies of all final retained articles were examined for additional relevant references.

3. Findings

The search terms and the number of hits for each are shown in Exhibit 1. After removing duplicate items, the search yielded 307 papers.

Exhibit 1: Statistics of PubMed Search, Sorted by Number of Hits

PubMed Term	Number of Hits
Bundles and health care delivery	83
Bundling and health care delivery	66
Bundling prevention	50
Bundled testing	37
Bundled clinical services	33
Bundled tests	32
Bundles and preventive care	23
Bundling of clinical services	16
Bundled preventive care	8
Bundles and preventive services	6
Bundling of preventive services	4
Clinical preventive services bundle	4
Bundled preventive service	1
Bundling and USPSTF	0
Bundling and US Preventive Services Task Force	0
TOTAL NUMBER OF PAPERS	363
TOTAL UNIQUE PAPERS	307

Following the title and abstract review, 17 articles were retained; five additional articles were identified through the analysis of references, bringing the total to 22. All articles are listed in Exhibit 2.

Exhibit 2: Full citations of articles identified in PubMed search and through reference search.

N	Articles identified in the search
1	Bull SS, Jones CA, Granberry-Owens D, Stoner BP, Rietmeijer CA. Acceptability and feasibility of urine screening for Chlamydia and gonorrhea in community organizations: perspectives from Denver and St Louis. <i>Am J Public Health</i> . 2000 Feb;90(2):285-6.
2	Callaghan P, Eales S, Coates T, Bowers L. A review of research on the structure, process and outcome of liaison mental health services. <i>J Psychiatr Ment Health Nurs</i> . 2003 Apr;10(2):155-65.
3	de Wet C, McKay J, Bowie P. Combining QOF data with the care bundle approach may provide a more meaningful measure of quality in general practice. <i>BMC Health Serv Res</i> . 2012 Oct 8;12:351
4	Eaton LA, Huedo-Medina TB, Kalichman SC, Pellowski JA, Sagherian MJ, Warren M, Popat AR, Johnson BT. Meta-analysis of single-session behavioral interventions to prevent sexually transmitted infections: implications for bundling prevention packages. <i>Am J Public Health</i> . 2012 Nov;102(11):e34-44
5	Farley TA, Cohen DA, Wu SY, Besch CL. The value of screening for sexually transmitted diseases in an HIV clinic. <i>J Acquir Immune Defic Syndr</i> . 2003 Aug 15;33(5):642-8.
6	Galvan FH, Bluthenthal RN, Ani C, Bing EG. Increasing HIV testing among Latinos by bundling HIV testing with other tests. <i>J Urban Health</i> . 2006 Sep;83(5):849-59.
7	Ghitza UE, Wu LT, Tai B. Integrating substance abuse care with community diabetes care: implications for research and clinical practice. <i>Subst Abuse Rehabil</i> . 2013 Jan 1;4:3-10.
8	Grimes DA, Raymond EG. Bundling a pregnancy test with the Yuzpe regimen of emergency contraception. <i>Obstet Gynecol</i> . 1999 Sep;94(3):471-3.
9	Heider J, Marshall C, Stopka T. Hepatitis C (HCV) testing as an incentive to increase HIV testing among IDUs in California. Demonstration project funded by CDC. 2003.
10	Hueston WJ, Stiles MA. The Papanicolaou smear as a sentinel screening test for health screening in women. <i>Arch Intern Med</i> . 1994 Jul 11;154(13):1473-7.
11	Ickovics JR. "Bundling" HIV prevention: integrating services to promote synergistic gain. <i>Prev Med</i> . 2008 Mar; 46(3):222-5. Epub 2007 Sep 29.
12	Koehler BE, Richter KM, Youngblood L, Cohen BA, Prengler ID, Cheng D, Masica AL. Reduction of 30-day postdischarge hospital readmission or emergency department (ED) visit rates in high-risk elderly medical patients through delivery of a targeted care bundle. <i>J Hosp Med</i> . 2009 Apr;4(4):211-8.
13	Lorenc T, Marrero-Guillamón I, Aggleton P, Cooper C, Llewellyn A, Lehmann A, Lindsay C. Promoting the uptake of HIV testing among men who have sex with men: systematic review of effectiveness and cost-effectiveness. <i>Sex Transm Infect</i> . 2011 Jun;87(4):272-8.
14	Parker VA, Charns MP, Young GJ. Clinical service lines in integrated delivery systems: an initial framework and exploration. <i>J Healthc Manag</i> . 2001 Jul-Aug;46(4):261-75.
15	Reilley B, Redd JT, Cheek J, Giberson S. A review of missed opportunities for prenatal HIV screening in a nationwide sample of health facilities in the Indian Health Service. <i>J Community Health</i> . 2011 Aug;36(4):631-4
16	Reynolds GL, Fisher DG, Napper LE, Marsh KA, Willey C, Brooks R. Results from a multiple morbidities testing program offering rapid HIV testing bundled with hepatitis and sexually transmitted infection testing. <i>Public Health Rep</i> . 2008 Nov-Dec;123 Suppl 3:63-9.
17	Salive ME, Guralnik JM, Brock D. Preventive services for breast and cervical cancer in U.S. office-based practices. <i>Prev Med</i> . 1996 Sep-Oct;25(5):561-8.
18	Schoenberg NE, Howell BM, Fields N. Community strategies to address cancer disparities in Appalachian Kentucky. <i>Fam Community Health</i> . 2012 Jan-Mar;35(1):31-43
19	Shenson D, Cassarino L, DiMartino D, Marantz P, Bolen J, Good B, Alderman M. Improving access to mammograms through community-based influenza clinics. A quasi-experimental study. <i>Am J Prev Med</i> . 2001 Feb;20(2):97-102.

N	Articles identified in the search
20	Spring B, Moller AC, Coons MJ. Multiple health behaviours: overview and implications. <i>J Public Health (Oxf)</i> . 2012 Mar;34 Suppl 1:i3-10.
21	Stopka TJ, Marshall C, Bluthenthal RN, Webb DS, Truax SR. HCV and HIV counseling and testing integration in California: an innovative approach to increase HIV counseling and testing rates. <i>Public Health Rep</i> . 2007;122 Suppl 2:68-73.
22	Vargas Bustamante A, Chen J, Rodriguez HP, Rizzo JA, Ortega AN. Use of preventive care services among Latino subgroups. <i>Am J Prev Med</i> . 2010 Jun;38(6):610-9.

Retained articles

The 17 articles which were retained from the PubMed search described several preventive services that are either already bundled or could potentially be bundled (Exhibit 3). The most common bundles were simultaneous testing for HIV and for other sexually transmitted infectious (STIs), such as hepatitis C, chlamydia, and gonorrhea (for example, Galvan 2006 and Reilley 2011). Some of the STI bundling studies examined the benefits of bundling relative to the provision of a single test and reported positive outcomes, such as increased testing frequency and reduction in the incidence of STIs.

The second group of bundled services was in women’s health. Examples described in the literature included simultaneously offered cervical and breast cancer screenings (Salive 1996), influenza shots and breast cancer screening enrollment (Shenson 2001), and pregnancy tests with emergency contraception. Only one of the studies examined the benefits of bundling and found that women who attending influenza clinics that offered to sign them up for mammography were twice as likely to receive a mammogram than women attending the clinics where the sign-up was not offered (Shenson 2001).

The third type of bundling described in the literature was linking mental health services with other care (for example, for diabetes and substance abuse) or targeting several adverse behaviors, such as smoking and drinking, at the same time (Ghitza 2013). Finally, some studies used bundling of services as a measure for the quality of care. De Wet looked at the data for five different conditions to determine how frequently patients with these conditions received various recommended services.

Exhibit 3: Bundles Proposed in the 22 Articles Reviewed

Bundle	Benefits of bundling	Reference
STIs		
HIV testing and screening for other conditions including alcohol and drug dependence; depression; and STIs	No difference between groups in the number of individuals taking the HIV test/testing positive with or without additional screening overall, although some positive effect of bundling was observed for sub-groups	Galvan, 2006
Single-session risk reduction interventions targeting HIV combined with other STIs	Reduced incidence of STIs	Eaton, 2012 (literature review)
HIV testing and standard prenatal testing	Not tested	Reilley, 2011
Chlamydia and gonorrhea	Better outreach to hard-to-reach populations; high notification and treatment of partners	Bull, 2000

Bundle	Benefits of bundling	Reference
HIV and hepatitis C testing for injection drug users	Tripling of HIV testing rates	Heider, 2003
HIV and hepatitis C	HIV counseling and testing (C&T) rates were significantly higher when HIV and hepatitis C C&T were offered together	Stopka, 2007
Chlamydia and HIV	Not tested	Farley, 2003
WOMEN'S HEALTH		
Community-based influenza vaccinations and mammography screening	Mammography use was 2 times higher for women attending influenza clinics where scheduling was offered	Shenson, 2001
Pregnancy test and emergency contraception (commercial kit approved by the FDA)	Not tested	Grimes, 1999
Clinical breast examination, mammography, and pap smear	Not tested	Salive, 1996
Pap smear and mammogram	Not tested	Bustamante, 2010
Breast, cervical, colon, and rectal cancer, hypertension, and cardiovascular disease testing	Not tested	Salive, 1996
MENTAL HEALTH AND SUBSTANCE ABUSE		
Community diabetes care and substance abuse care	Not tested	Ghitza, 2013
Smoking and addressing additional adverse behaviors	Not tested	Schoenberg, 2012
Liaison mental health services (integrating mental health services into hospital or clinic settings where patients sought care for physical illness)	Not tested	Callahan, 2003
OTHER		
Smoking cessation, colorectal cancer screening, and influenza vaccination	Not tested	Bustamante, 2010
Medication counseling/reconciliation, education/enhanced discharge planning by a care coordinator, and phone follow-up.	Intervention group readmission/emergency department visit rates were reduced at 30 days, but not at 60 days compared to the control group	Koehler, 2009
Secondary prevention of coronary heart disease; stroke and transient ischemic attack; chronic kidney disease; chronic obstructive pulmonary disease; and diabetes mellitus.	Not tested	De Wet, 2012.

Rejected articles

The titles of rejected articles were briefly examined. Of 290 papers rejected, 57 (20%) were on the subject of bundled payment for services, which refers to payment for episode of care, rather than per service. In addition, bundling appears to be used frequently in the literature on infection control – 85

(29%) rejected papers were on this topic. In this context, several antibiotics administered together or a combination of antibiotic treatment with another intervention to prevent infections are considered to be bundled. Outside of the infection management literature, combinations of drug treatments and procedures are also sometimes called “bundled,” but these instances are rare (for instance, “Changes in anemia management and hemoglobin levels following revision of a bundling policy to incorporate recombinant human erythropoietin” by Hasegawa 2010).¹ Finally, 36 (12%) rejected papers were on cellular bundles (e.g., microtubules).

4. Conclusions

Based on the PubMed search, we have made the following conclusions. Numerous services that are bundled – that is, offered together – are not described using this term. For example, several childhood vaccinations are typically administered during the same pediatric visit (Offit et al, 2002),² and yet we did not capture any of these studies in the search. Similarly, adult “wellness visits” include various screenings and immunizations, but only a very small number of these studies emerged from the search.

At the same time, the term “bundling” is used in different contexts, for example, to describe reimbursement for services. Finally, while few articles explicitly addressed bundling of clinical preventive services, even fewer examined whether bundling resulted in positive health outcomes. Similarly, our search did not yield any studies that examined barriers and facilitators to bundling of clinical preventive services, such as provider perspective or issues related to patient communication.

5. Future Directions

The scope of this paper was intentionally limited to examining how the term “bundling” is used in the literature. Based on the search, we identified a number of gaps which could be addressed through further studies. These include, but are not limited to the following topics:

- Examination of the efficacy of currently bundled clinical preventive services, regardless of whether they are termed “bundled” by payers or providers;
- Identification of additional clinical preventive services that can be bundled based on the U.S. Preventive Services Task Force (USPSTF) recommendations and examination of the feasibility and efficacy of these bundles;
- Potential challenges to bundling of clinical preventive services, such as inadequate provider time to discuss the bundles with a patient, risk of overwhelming the patient with information, complexities in coordinating multiple diverse services, inadequate access to services;
- Benefits of bundling of clinical preventive services, such as cost savings, efficient use of provider and patient time, improved access to and utilization of necessary services;
- The balance of benefits and limitations of bundled clinical preventive services.

¹ Hasegawa T, Bragg-Gresham JL, Pisoni RL, et al. Changes in anemia management and hemoglobin levels following revision of a bundling policy to incorporate recombinant human erythropoietin. *Kidney Int.* 2011;79(3):340–6.

² Offit PA, Quarles J, Gerber MA, et al. Addressing parents' concerns: do multiple vaccines overwhelm or weaken the infant's immune system? *Pediatrics.* 2002;109(1):124–9.